

HEAVY BOMBER REQUIREMENTS FOR THE LATE 1990S:  
A CASE STUDY OF THE B-52

A thesis presented to the Faculty of the U.S. Army  
Command and General Staff College in partial  
fulfillment of the requirements for the  
degree  
MASTER OF MILITARY ART AND SCIENCE

by

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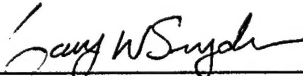
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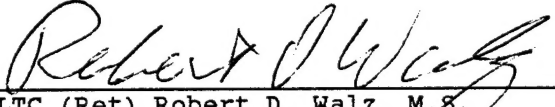
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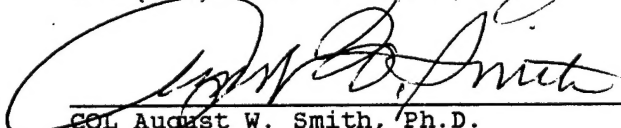
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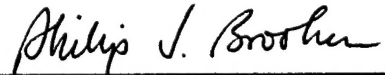
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## ABSTRACT

HEAVY BOMBER REQUIREMENTS FOR THE LATE 1990S: A CASE STUDY OF THE B-52  
by Major Randall M. Walls, USAF, 82 pages.

This thesis examines the position the B-52 has filled in support of U.S. national security objectives and deterrence. This thesis recommends that the B-52G augment the bomber fleet until the B-2 and new precision guided munitions become available in amounts necessary to serve as force multipliers. The thesis also evaluates whether or not the B-52 will continue to have a place in post-Cold War U.S. defense strategy.

The historical contribution of the B-52 provides the background data for this analysis. Operations during the Battle of An Loc, Linebacker II, and Operation DESERT STORM are the focal points for this study.

This study assists in the determination of any significant deltas that may exist between the number of B-52s required to augment the bomber force currently funded and the base force recommended in the Bottom-up Review. It examines whether those deltas are fiscally or operationally biased.

The thesis concludes that the B-52G should augment the planned bomber force structure, until such time the B-1 and B-2 can satisfactorily accomplish the conventional wartime mission.

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## CHAPTER 1

### INTRODUCTION

The threat of a major regional conflict was a very real proposition in early October 1994, when the U.S. prepared to deploy a force of 19,000 Marines, six B-52 bombers, and 12 F-117 stealth fighter planes to the Persian Gulf in an immediate response to post-Gulf War movements of elite Iraqi forces to the border of Kuwait. The threatening Iraqi military buildup, which took place just over three years after the 1990 defeat of Iraq by Coalition forces, was met quickly by U.S. defense officials. The plan placed a force of 600 planes, 40,000 ground troops, and 155,000 additional troops on alert, including nine B-1 bombers. As U.S. forces poured into the Gulf region to meet the hostile action, Iraqi forces withdrew from the Kuwait border largely as a result of the deterrent power of swift global response.

This most recent deployment demonstrates the ability of U.S. forces to quickly cover great distances in response to crises requiring the use of military power. Aircraft are often the spearhead of force projection by virtue of their capability to cover greater distances around the world faster than other assets. Throughout history, the heavy bomber has provided the U.S. a capability to deliver combat power quickly and to change the course of a conflict.

Presently, the B-52 is the nation's only heavy bomber platform with a history of proven combat success. The B-52 performed superbly in

its deterrent role during the Cold War, in Vietnam, and the recent Gulf War; highlighting its capabilities by achieving impressive results in a variety of strategic attack, air interdiction, and offensive counterair missions. From leading the way as a strong deterrent weapon system during the Cold War, through the success of Linebacker missions during Vietnam, to the constant day and night pounding of the Republican Guard during Operation DESERT STORM, the B-52 remains the nation's only combat-tested heavy bomber platform. Despite its age and multiple equipment modernizations, it is still capable of delivering the vast majority of our conventional and nuclear weapons inventory.

Given the importance of the bomber's capabilities, efforts to downsize the military, changing funding priorities, and accepting risk that a major contingency is unlikely to happen over the next five years are key issues defense planners must analyze to determine the desired mix of bomber aircraft for future force structure.

#### Thesis Purpose

Thus, in light of the debate, this thesis examines the role the B-52 has filled in support of deterrence and U.S. national security objectives. This paper also evaluates whether or not the bomber will continue to have a place in the post-Cold War U.S. strategy. Operations during the Vietnam and Gulf Wars underscore the necessity of having a flexible heavy bomber force able to respond to a variety of conventional and unconventional taskings. This thesis will evaluate the B-52's performance and contributions during the An Loc and Linebacker campaigns in Vietnam, its effectiveness in Desert Storm, and equate against current thresholds of the two major regional contingency (MRC)



strategies. This thesis assists in the determination of any significant shortfalls that may exist between the number of B-52s required and the likelihood of a reduced heavy bomber force during the latter part of the 1990s. It also examines whether those shortfalls are fiscally or operationally biased.

#### Thesis Question

What are the operational and tactical implications for the current U.S. global strategy if the U.S. retires B-52G heavy bombers and is unable to meet the Bottom-up Review (BUR) baseline requirements for 184 bomber aircraft?

#### Secondary Questions

Secondary questions arise when attempting to answer the primary one such as: Can the B-52G, if saved from retirement, still be a viable weapon system in today's modern air, land, and sea battlefield environments? The existence of precision-guided munitions (PGMs), air launched cruise missiles (ALCMs), and new systems currently in development permit the older weapon systems, such as the B-52, to serve in a standoff role early in the conflict until such time as air superiority or air supremacy is achieved. This way, the airframe continues to provide effective weapons delivery capabilities until such time as the air environment is safer, so that older, less stealth capable aircraft can transition from a standoff role to a close-in role.

This leads to the next question: Can the B-1's conventional munition's capability match that of the B-52? The B-1 did not participate in Operation DESERT STORM due mainly to its nuclear commitment, and it had not earned certification to release several

classes of conventional munitions. In addition, questions exist on the effectiveness of the B-1's electronic countermeasures equipment to combat modern aircraft defenses in today's battlefield environments.

A third underlying question involves procurement of advanced munitions designed to be force multipliers: Will procurement delays in modern and advanced munitions compound the shortage of strategic bombers supporting the two MRC scenarios? Many of today's congressional leaders argue the recent success in the Gulf War warrants concentration in the areas of improved PGMs and other smart weapons; making the need of redundant, older systems less desirable. Yet, Congress is reducing the funding for these more modern systems, such as the Tri-Service Standoff Attack Missile (TSSAM).<sup>1</sup> The Joint Direct Attack Munition (JDAM) and Joint Standoff Weapon (JSOW) also enhance bomber force effectiveness, but face crucial funding decisions, as well.

#### Background

As a result of downsizing the military and its associated operating budgets, the Department of Defense began retiring the B-52G at a rate of 2-3 per month while relying on the B-52H and the conventionally unproved B-1B to handle the heavy bomber mission. Many leaders in civilian and military circles realize a danger of returning a "peace dividend" too quickly by retiring older weapon systems, and scaling back program funding, without first ensuring a strong deterrent military force structure. At least four research studies and independent reviews have stated the need for a larger strategic bomber force mix of B-52, B-1, and B-2 aircraft. Based on these reports of a potential deficit in heavy bomber assets, Congress directed a temporary

halt to B-52 retirement until more information is available in regard to future requirements. In addition to the temporary halt of aircraft retirements, Congress authorized an additional \$60 million in operation and management funds for B-52 operations for the remainder of FY 95, above the 107 B-52s already funded, until lawmakers can determine the B-52's fate. Similarly, budget issues and political concerns related to the "peace dividend" are holding bomber procurement and associated support programs in check.<sup>2</sup>

Despite the planned delivery of 20 B-2 bombers and retrofitting the B-1B bomber with conventional weapons capability, neither of these platforms have participated in combat, and the B-2 has not yet reached initial operational capability (IOC). IOC is the ability of the weapon system to conduct its combat mission. Thus, experts believe the planned retirement and subsequent destruction of the B-52G could leave a significant gap in heavy bomber attack capability for the remainder of this decade, and into the next. With a potential congressionally mandated shutdown of the B-2 bomber industrial base after contract completion of the 20th bomber, it is conceivable that restarting the production of the B-2 could take up to one year. This time delay would be unacceptable should world events dictate the need for additional bomber forces.<sup>3</sup>

Many reasons exist for the apparent gap between requirement and availability. Military downsizing, increased lethality of new PGMs that require fewer assets overall, over confidence resulting from the recent successes in Operations JUST CAUSE and DESERT SHIELD/DESERT STORM, and reoriented priorities in the post-Cold War era are just a few of the

reasons why. Perhaps more importantly, it does not appear lawmakers will authorize increased appropriations to fund the heavy bomber package of 95 B-52Hs, 96 B-1Bs, and 20 B-2 bombers recommended in the Department of the Air Force's Bomber Roadmap.<sup>4</sup> Although the preceding numbers total 211 bomber aircraft in the force inventory, this number reflects 27 more than baselined in the BUR; a Department of Defense review of defense forces detailing the forces, programs, and defense budgets the United States needs after the Cold War. The BUR states, "the FY 1995-99 Defense Program proposes bomber forces be reduced below the BUR force objectives . . . to approximately 140 bombers by 1999."<sup>5</sup>

History has demonstrated the importance of bombing by B-52s beginning with operations during the Vietnam War and, most recently, in Operation DESERT STORM. During the Vietnam War, the success of the North Vietnamese, in late November and December 1972, forced then President Richard Nixon to order the implementation of the Linebacker II bombing campaign which directed the strategic bombing of North Vietnam using B-52 and Navy A-6 bombers. The purpose of the campaign was to force the North Vietnamese to the negotiating table and ward off waning U.S. domestic support before it could persuade Congress to cut federal funding for the war.<sup>6</sup> The 11-day intensive bombing campaign that ensued, beginning in mid-December, was so effective and threatening to the North Vietnamese that it brought them back to the negotiating table.<sup>7</sup> In addition to the extensive damage to strategic targets and the continued degradation of their air and land defenses to the intensive bombing, reports from North Vietnamese refugees and prisoners of war following the campaign identified the B-52 bombing raids as

having the ability to ". . . shock the mind and undermine the (enemy) spirit."<sup>8</sup> Comments which would be repeated again during the Gulf War.

Post-Vietnam brought about an inevitable downsizing in military personnel, reductions in force resources, and discussions about a new bomber to replace the aging B-52. The first replacement bomber aircraft appropriated for full-scale development was the B-1B; however, Congress only funded 100 of these aircraft to augment the aging bomber fleet then composed of approximately 75 B-52D, 165 B-52G, and 90 B-52H aircraft.

Shortly after the B-1 reached IOC, officials introduced the B-2 Stealth bomber as the bomber of the future. This newest addition to the bomber fleet remains embroiled in controversy regarding the actual number of aircraft Congress should fund.

While defense planners, independent studies, and researchers were trying to predict where the next conflict might occur, Congress authorized 100 B-1B's in the 1980s and 20 B-2's during the early 1990s. Despite the acquisition of new bomber aircraft, the B-52 remains the work horse of the bomber force.

Soon after the end of the Cold War, the B-52 answered the call once again during Operation DESERT STORM. In his book, It Doesn't Take A Hero, now retired General Norman Schwarzkopf, related a discussion with Air Force Colonel John Warden about the devastating effects the B-52 could bring to the table.<sup>9</sup> After learning the U.S. could expect to achieve air superiority over the Iraqi Air Force soon after the start of hostilities, General Schwarzkopf insisted the B-52s bomb the Iraqi Republican Guard, determined by planners to be an enemy center of

gravity. He insisted on the use of B-52s, so they could "bomb them every day starting with the first day because they are the heart and soul of his [Saddam Hussein's] army; therefore, they will pay the price."<sup>10</sup> The relevance of this comment is the decisiveness General Schwarzkopf felt bombers brought to the theater commander and their role as part of the military instrument of power. Without the B-52, Schwarzkopf feared the campaign would become protracted causing unnecessary fighting with resultant increased casualties.<sup>11</sup>

Since the end of the Cold War, future military force structure is contingent on the threat presented from countries identified in the two MRC geographic areas by the BUR--Northeast and Southwest Asia. As stated earlier, the BUR provides a recommendation to defense planners of 184 heavy bombers for future conflicts, but problems exist. First, Congress has funded only 107 of the 184 bombers called for in the BUR for FY 95. Additionally, the BUR points out that even fewer than 184 will receive funding in the FY 1995-1999 Defense Program. Thus, if a conflict should erupt, the question becomes, "Are there enough bombers to go around?"

More importantly, defense officials have presently certified the B-1B bomber only to carry Mk-82, 500-pound, conventional, unguided munitions. The B-1 recently completed testing of its conventional bombing capabilities and mission capable rates. Initial reports from this testing indicate the aircraft is satisfactorily accomplishing conventional weapons releases; however, shortages of spare parts for operational aircraft not involved in the actual test resulted in lower mission capable rates for nontest aircraft.<sup>12</sup> In other words, the test

is benefiting from the presence of spare parts in amounts that would not ordinarily be available in actual combat environments. To postulate further, if planners committed large numbers of B-1s into combat, procurement funding for B-1 spare parts acquisition would have to increase accordingly to provide the necessary parts. If the Air Force receives the desired funding levels for the required spare parts, it believes it can attain the 75 percent mission capable rate, as demonstrated in recent tests, it needs to be considered mission effective.

With fewer bomber aircraft funded and the B-1 undergoing certification testing, the third area of concern is the heightened tensions that exist within the two MRCs--North Korea and Iraq. Many planners see committing bomber forces to these areas nearly simultaneously as a serious test of the planned bomber force structure.

Several independent studies that forecast heavy bomber requirements in future conflicts based on computer modeling and simulations are in existence. The results of these studies will assist in qualifying and quantifying future bomber force requirements this thesis may discover. However, the restricting factors appear more the result of funding constraints rather than actual force requirements.<sup>13</sup>

Proponents supporting larger heavy bomber force structures advocate from the outset that the U.S. must maintain its current number of heavy bombers until such time as Congress procures an operational replacement, capable of delivering the weapons currently employable from the B-52. Recent reports from newspaper, television, and military



journals reveal serious concerns from our congressional and military leaders in regard to present bomber capabilities.<sup>14</sup>

#### Underlying Assumptions

The primary assumptions for this thesis are as follows:

1. The two MRC strategy involves Northeast and Southwest Asia as described in the Bottom-up Review. The focus in these regions is not entirely new; these regions mirror similar expert concerns after Vietnam when planners identified North Korea and the Middle East as potential conflict areas.<sup>15</sup>

2. The B-1 bomber will earn conventional munition's certifications similar to the B-52. Current operational testing of the B-1's conventional weapons release capability indicate the aircraft can successfully release weaponry commensurate with that of the B-52. B-1 weapon certifications would provide two heavy bomber platforms capable of employing conventional munitions in combat.

3. The need to have heavy bomber platforms will continue into the next decade. Force projection roles for US forces will dictate the need to engage potential enemies early in the conflict from bases and facilities far removed from the conflict area. The greater air distances from basing locations to planned theaters reduces the sorties-per-day ratio for bomber aircraft; thus, there is an increased requirement for more bomber aircraft to maintain needed sortie generation.

4. Funding for 184 bombers will not occur. Public pressure on Congress to realize a "peace dividend" from the end of the Cold War

will result in reduced funding for many Department of Defense programs; including modernization programs and new weapon systems procurement.

5. One-hundred strategic bombers per MRC is a valid planning consideration. This assumption recognizes the advantages stealth technology contributes to reduced bomber strike force packaging; hence, fewer aircraft are required per mission.

These assumptions provide the necessary focus for this thesis and coincide with the Bottom-Up Review and the Eighth Air Force's "Bomber Roadmap: The War Fighter's Guide to Heavy Bomber Employment." Also, the current and ever-changing political developments in North Korea concerning North Korea's new leader and nuclear non-proliferation issues have resulted in increased force readiness by South Korean and U.S. forces. Further, the recent increase to U.S. presence in the Persian Gulf in response to Iraq's October 1994 redeployment of troops along the Kuwaiti border places real-world importance to the two-MRC scenario.

#### Key Terms Defined

Bottom-Up Review (BUR). Report generated by the Secretary of Defense outlining future force structure requirements based upon the end of the Cold War and assets needed to fight in two MRCs.

Air-Launched Cruise Missile (ALCM). A missile launched from an airborne platform that flies along a preplanned route to a target using inertial measurement unit guidance inputs. During Operation Desert Storm, the B-52 launched modified ALCMs with conventional warheads against Iraqi targets.

Iron Bomb. An unguided conventional weapon that falls freely along a ballistic flightpath when released from a delivery platform until impact against a designated target or target area. Some users also call this weapon a "dumb bomb" because it has no inertial guidance or remote steering hardware attached to it.

Joint Direct Attack Munition (JDAM). This weapon is a precision guided, 2,000 pound class, munition ideally suited for adverse weather conditions. This weapon has undergone several improvements to increase its flexibility as an Air Force and Navy weapon, incorporating inertial guidance and Global Positioning System inputs for enhanced accuracy.

Joint Standoff Weapon (JSOW). This precision guided munition "provides accurate standoff anti-armor capability, enabling bomber aircraft to launch outside the range of ground unit antiaircraft defenses, and achieve multiple kills per JSOW using sensor-fuzed weapons." <sup>16</sup>

Major Regional Conflict (MRC). Regional geographic area determined by military planners to be the most likely location for future conflict against which the U.S. plans force structure, weapons procurement, and training scenarios.

Precision Guided Munitions (PGM). A weapon having precise guidance systems, such as inertial guidance, laser, or global positioning that provides a high probability of target destruction.

Strategic Attack. Operations designed to destroy an enemy's leadership, command and control assets, industrial infrastructure, lines of communication, and other key war-fighting capabilities that can

effect a decisive victory over an enemy, or negatively effect the enemy's center of gravity.<sup>17</sup> Strategic attack has, historically, been associated with strategic bomber aircraft. With the advent of more modern weaponry, the target category drives the strategic or tactical terminology, not the weapon delivery platform employed.

Tri-Service Standoff Attack Missile (TSSAM). This weapon is a precision guided missile having stealth characteristics capable of "extended range (100nm+) with an autonomous precision warhead and combined effects submunition . . . yielding tremendous flexibility and the ability to destroy small, high value targets from outside the high threat environment."<sup>18</sup> This system has lost partial Congressional funding during FY 95.

#### Imposed Constraints

This thesis will remain unclassified to allow the widest dissemination. This constraint does not dilute the value or validity of the thesis.

This thesis' historic analysis focuses on the An Loc and Linebacker campaigns of the Vietnam War since these events were two of many which highlighted the importance of B-52 bombing on the physical and psychological effects on the North Vietnamese. In the case of the Linebacker II missions, the results of steady B-52 bombing missions brought the North Vietnamese to the negotiation table.

The DESERT STORM conflict was short enough in duration that most of the data concerning the B-52's contribution throughout the conflict is available for analysis; however, additional new insights and information continue to surface. The B-52's contribution during the

Gulf conflict in a modern war environment is an example of the B-52's continued utility as part of the global projection force.

This thesis may refer to some generic characteristics of weapon classifications, such as air-launched cruise missiles, precision-guided munitions, or iron bombs for reader orientation; but will not address fragmentation patterns and in-depth methods of aerial delivery.

To further limit the scope of this project, the application of heavy bombers concentrates on the two regions listed as the most probable scenarios in our two MRC strategy--Northeast and Southwest Asia. Although many countries are currently experiencing political and domestic unrest: Bosnia, Haiti, Rwanda, and Nigeria, to name just a few, the likelihood of using heavy bombers in areas outside the two MRCs, at present, is unlikely.

#### Significance

This thesis provides additional analysis of the contributions the B-52 has made, providing pertinent information in order to identify the correct, or incorrect, bomber force numbers. Thus, this analysis offers a further basis for decision making at the strategic and operational or national security level. Repeatedly, discussions to replace the B-52 with the B-1 and B-2 have risen; yet, as recently as October 1994, planners prepared to send six B-52s to persuade Sadaam Hussein to remove his massed forces from the Kuwaiti border, and not the B-1.<sup>19</sup> For the first time, defense officials called upon the B-1 as part of a reaction force formed to meet this regional threat by in Southwest Asia; however, none of the nine aircraft actually deployed

after Hussein backed down from his aggressive posture on the Kuwait border.

This thesis does not advocate keeping the B-52 forever; it examines the importance of maintaining this combat proven asset until a replacement emerges in sufficient number and with the required weapons to ensure our strategic bombing capabilities.

## CHAPTER 2

### LITERATURE REVIEW

This thesis examines the gap between schools of thought supporting the need for a larger heavy bomber force structure and those calling for a smaller one. The research explores whether or not a gap exists, looks at different interpretations of existing data, and determines if other factors exist which outweigh the military requirement for a larger bomber force. The intent of this thesis is to gather information from historic analysis of past heavy bomber employment and to establish a correlation between a satisfactory bomber force structure and future success in a major regional conflict. This thesis concentrates on historical data from the Vietnam era to the present to show the impact of the heavy bomber on the battlefield. Also, the research investigates the importance of maintaining a viable bomber force, regardless of the level of conflict.

The research literature was readily available in the Combined Arms Research Library (CARL) at Fort Leavenworth, Kansas. Additional information from Headquarters Eighth Air Force helped quantify and qualify technical and operational bomber information found in periodicals and books. During the course of this research, I discovered extensive data in the form of classified studies, reports, and analyses surrounding the B-52. To keep this thesis unclassified, no classified



information was incorporated. Adequate open source literature was available to answer primary and secondary research questions.

History indicates that each post-conflict military drawdown is followed by a diligent military buildup to correct deficiencies caused by rapid, or poorly thought out reductions. Many media sources have current and relevant information pertaining to this subject.

A key source of information is the Annual Report to the President and the Congress which contains the Bottom-Up Review (BUR). This report, developed for former Secretary of Defense Les Aspin, set the baseline requirements for 184 heavy bombers to support two major regional contingencies (MRCs) occurring nearly simultaneously. This figure is "asterisked" in the BUR. This asterisk reflects the actual intended funding objectives through the FY 1999 Defense Program, which is below the needed bomber forces recommended in the same report. Therefore, a mixed message exists for planners who need 184 bombers for the two MRC strategy, but only have 107 bombers presently funded. To better understand the intent of future force structure requirements, the BUR presents an example of a "building block scenario" for military forces and assets needed to support a major contingency. In that example, up to 100 deployable bombers are needed in the first MRC at the start of hostilities to execute the preplanned defense strategy, while maintaining a deterrent force with the remaining bombers not deployed. Planners predicate bomber assets for the second MRC based on as little as 45 day's separation between commencement of hostilities. Despite the stated requirement, funding for strategic bombers in FY 1995 is "set

for only 107, and it does not appear funding for the full 184 will occur before the end of the decade."<sup>20</sup>

The differences between the B-52G and B-52H model aircraft are important to the understanding of bomber force structure requirements. The G-models are an older version of the B-52, primarily assigned to a non-nuclear mission. The B-52H is a more modern version equipped with more powerful engines, a greater unrefueled range, and an extensive capability to deliver standoff platform weapons, such as air-launched cruise missiles. The H-model will eventually replace the G-model as the only remaining B-52 bomber.

The Eighth Air Force "Bomber Roadmap" provides the strategy that supports the bomber requirements defined in the BUR. Focusing on requirements through the 1990s, this document details the thought processes requiring 100 deployable bombers for a major regional contingency. It examines the reasons why planners decided to retire the B-52G while electing to modernize newer B-52Hs to augment the B-1 and B-2 platforms.

Three studies, (1) a computer modeling study on attrition analysis conducted in 1978 by an Air Force Institute of Technology (AFIT) student; (2) excerpts from a 1992 research paper (updated in 1994) entitled, "Conventional Long-Range Bombers," written by Major General Jasper Welch, USAF (Retired), as published in Air Force Magazine;<sup>21</sup> and (3) a 1993 RAND Corporation study on airpower's changing role; provide important quantitative data to support this thesis. Jasper's article argues the present bomber force is insufficient to fight just one major regional conflict, and is inadequate against two.

To date, a preponderance of information appears to support the need for a larger bomber force structure, although differing opinions do exist for the smaller force. Since AFIT and the RAND Corporation are Air Force sponsored education and research facilities, this author will use them as contributing, but not necessarily definitive sources in arriving at a conclusion.

The U.S. Air Force doctrinal foundation for the employment of air power that led to the evolution of the bomber was found in AFM 1-1, Volumes I and II.

Supporting information for this thesis consists of published books, military periodicals, professional journals, newspapers, magazines, and government publications. Other sources of information include Congressional testimonies, government-sponsored research reports, monographs, and unpublished theses written by members from intermediate and senior service schools. Research reports written by officers attending other intermediate and senior service schools recognize the increased importance of air power, particularly strategic bombing, on the battlefield as part of a "whole" force package. A paper written by Air Force Colonel Richard G. Meck, "Strategic Bombers in a Flexible Response Strategy," outlined the role B-52s have played in flexible response strategy beginning with the Vietnam War, and cautioned against the premature scrapping of the B-52.<sup>22</sup>

Key sources of information to this point include a book from the RAND Corporation, The New Calculus, written in conjunction with an Air Force-sponsored study analyzing airpower's future role in the post-Cold War environment. This report takes the scenario called for in the

two MRCs, applies computer models to draw conclusions about airpower's future capabilities, and determines a recommended force structure for the future. History can validate much of the data contained in this source; yet, conservative planning variables used in the study may be subject to further scrutiny because some models did not reflect worse-case scenarios.

Detailed historical accounts of the B-52's performance during the Linebacker II campaign exist in the book Setup: What the Air Force Did in Vietnam and Why by Earl H. Tilford, Jr. This book provides many interesting facts and insights from a planner's perspective and from key government officials, such as former President Richard Nixon and former Secretary of State Henry Kissinger. In this book, they describe the impressive effects of the B-52 during the Vietnam War. Additional historical data from Operation DESERT STORM appeared in the government report "The Conventional Bomber Force War-Horses for Global Conflicts: Capabilities, Limitations, and Modernization," by Lieutenant Colonel V. Frank Vollmar. This report focuses on "whether the conventional bomber force is adequately organized, equipped, and modernized to deter conflicts as well as respond to new conflicts."<sup>23</sup>

Research into the roles, functions, and missions of the bomber during prior conflicts which mirror potential contingency scenarios exist in a RAND Corporation study entitled "Roles and Missions for Conventionally Armed Heavy Bombers--An Historical Perspective."

For research into the overall military impact bombers had on the outcome of the Gulf War, the Department of Defense "Final Report to Congress on the Conduct of the Persian Gulf War" and the "Gulf War Air

Power Survey," Volume II, provides detailed results of the bomber's performance during our most recent conflict.

The American Defense Annual 1991-1992 provides background data on the Strategic Arms Reduction Treaty (START) limits imposed on U.S. strategic forces weapon delivery platforms. This research helps explain the effect START limitations have on deployed launcher platforms in the current weapons inventory, and it helps in understanding the rationale of U.S. government decisions to keep, or fund, a particular weapon system over another.

Several Government Accounting Office reports provide additional facts and figures on costs associated with weapons and weapon systems procurement for the B-1 and B-2 in comparison to the B-52. This information helped place cost comparisons in proper perspective by contrasting needs and wants against costs associated with procuring one system over another.

Additional key works include congressional testimonies from former Secretary of Defense (SECDEF) Les Aspin and former Chairman of the Joint Chiefs of Staff (CJCS), now retired, General Colin Powell, given before the Senate Armed Services Committee. These testimonies provided detailed explanation of the force structure requirements called for in the BUR. Former Secretary Aspin made a subsequent appearance before the House Appropriations Committee to provide similar testimony. These testimonies provide broad insight to the intent and direction described in the Bottom-up Review.

The Air Force Times, Air Force Magazine, and Jane's Defence Weekly contain several articles with continuous updates on bomber readiness and the potential impact of changes in bomber force structure.

Opposing viewpoints not in favor of a larger bomber force do exist, but not to as great an extent. On-line news services, military periodicals, and key Congressional leaders have reported numerous inferences to defense officials accepting "risk," in the face of fewer budget dollars, to free additional funding for more modern precision munitions.<sup>24</sup> The degree of risk considered acceptable centers around the argument as to whether or not the B-1 and forthcoming B-2 aircraft can attain the desired level of mission effectiveness required in the BUR without the need for additional support from older bombers such as the B-52G. In an article published in Air Force Magazine, former Chief of Staff of the Air Force General Merrill McPeak said that funding appropriations for modern precision munitions were at the expense of the bombers and other programs because he was directed to accept a level of risk with the bomber inventory.<sup>25</sup> However, he added that he expected the bomber numbers to go up toward the end of the century after the precision munitions became operational to the extent they complimented the bomber platform as a weapon system.

Research supporting a larger, or smaller, heavy bomber force structure appears divided along political lines. Supporters of the current administration are working very hard to come up with the President's "peace dividend" promised during his campaign by supporting the smaller force structure package.<sup>26</sup>

Conversely, many supporters of a larger bomber force, express "concern" that a smaller force package will precede a "hollow force" similar to that experienced after drawing down military forces following the Vietnam War. They point out that although the U.S. no longer has the Soviet Union as its primary enemy to base, and build, its force structure against, the U.S. should examine very closely the impact of not having the recommended bomber inventories. All U.S. weapon systems, in addition to heavy bombers, continue to age and to require modernization to ensure future force readiness.



### CHAPTER 3

#### METHODOLOGY

The thesis methodology centers on three interrelated questions and will examine each one in its own chapter.

The first question is: Is there a need for heavy bombers in the current national defense strategy? Historical analysis of past conventional bomber platforms will assist in the examination of the question. The An Loc and Linebacker missions during Vietnam and the Gulf War draw parallels to the two MRC strategies that define the threat areas as North Korea and Southwest Asia. Specifically, the An Loc missions in April of 1972 and the Linebacker II campaign conducted from 17-29 December 1972 will represent the parallel to the Northeast Asia MRC; and Operation DESERT STORM, conducted from January through February 1990, will represent the MRC from Southwest Asia. This analysis constitutes Chapter 4.

These campaigns build a case for the historic requirement for a heavy bomber force and will detail how this historical role applies to the "new" strategy called for in the BUR. The BUR outlines the heavy bomber requirements dictated by the two MRC strategy; history may show how the B-52 fits into those plans based upon previous experience as it parallels current defense strategy.

The Linebacker II campaign demonstrates the ability of heavy bombers to assist in the attainment of national objectives and in bringing the enemy to the negotiating table; the result of 11 days of

continuous bombing by B-52 and Navy A-6 bombers. This campaign was significant in that it teetered on the edge of success and failure. The failure would occur if the continued loss of B-52 bombers over North Vietnam brought additional pressure for the U.S. to end hostilities at a time when the North Vietnamese had the upper hand. It would bring success if the unrelenting pressure caused by non-stop bombing brought the North Vietnamese government to the negotiating table.

This analysis also includes some of the key reasons planners selected the B-52 for the Linebacker II missions over other aircraft in the inventory. For instance, the B-52's all-weather and night-flying capabilities, its capability to deliver more weapons than any other airplane in its conventional configuration, and its bomb dispersal pattern made it the weapon platform of choice.<sup>27</sup> These capabilities were absent from fighter aircraft which lacked the large weapon carrying capability and all-weather bombing instrumentation. Some of these capabilities are still applicable today, particularly in regard to large conventional weapon loads. If similar targets exist today, the similarities would contribute to the viewpoint that maintaining sufficient numbers of heavy bomber aircraft with similar capabilities for future conflicts is essential.

Almost 20 years later, the B-52 bomber displayed its destructive firepower once again during Operation DESERT STORM. Not only was the B-52 the only heavy bomber used, it flew strike sorties on D-Day, launching ALCMs against targets in Baghdad, Iraq. Throughout the course of the air and ground campaign, the B-52 flew the fewest sorties percentages wise; yet, dropped nearly 50 percent of the total bomb

tonnage.<sup>28</sup> Analysis of the contribution of these statistics attributed to the B-52 during the Gulf war will assist in the evaluation of its role and will assess its continued value to national defense.

Former President Nixon's situation in late 1972 was much the same as that experienced by President Bush during the Gulf war. A wary public looking over the shoulder of military operations and mounting casualty figures were influencing popular opinion during the Vietnam War. Those same concerns affected Bush in 1990, only in a different conflict. In October, 1994, President Clinton experienced similar public concerns, when he committed B-52 and B-1 bombers as a deterrent force to encourage Sadaam Hussein to remove his massed troops from the Kuwaiti border. Officials did not launch the alerted bombers due to the success achieved by the rapid response of U.S. ground forces deployed to the region. Essentially, defense planners had prepared for the worst case scenario in the event Hussein invaded Kuwait. These events, spanning over three decades, highlight the deterrent value the heavy bomber force projects as a military instrument of power.

During the response to Hussein's action on the Kuwaiti border, the U.S. was actively engaged in operations other than war in Haiti, Bosnia-Herzegovina, and Somalia. Defense planners began to see the impact several simultaneous regional hotspots have on reduced force structure assets. This assists in the evaluation of bombers in contingency operations where forces are already committed. This analysis constitutes Chapter 5.

If the answer to the question posed in Chapter 5 on the appropriateness of the bomber's place in national defense is yes, the next question regards the necessary bomber force structure mix.

Specifically, if there is a role for heavy bombers, how many and what mix (B-52, B-1, B-2) should the bomber force contain? This analysis will center around the requirements to attack 1,100 critical targets relative to the delivery assets available. Some analytic studies recommend a bomber mix consist of older, existing bombers to augment the proposed fleet of newer B-2s. The BUR called for a baseline of up to 184 bombers. However, the BUR only specifies funding for 140 bombers by 1999 in the following mix: 48 B-52H bombers, 72 B-1Bs, and 20 B-2s.<sup>29</sup> Allocated funding for bombers during FY 95 is for 107 aircraft.

Several important facts exist that provide a basis for the critical threshold of the current bomber force structure. First, the question examines the implications the funded bomber force structure has for the two MRC strategy. Analysis of data provided by the RAND Corporation, AFIT, and other studies (which recommend a larger bomber force) contrast with budget requirements calling for a smaller force for the remainder of the 1990s. This contrast provides one of the key arguments for this thesis.

Another critical threshold area for examination is the capability of the B-1 to assume the duties currently assigned the B-52. If the B-1 is unable to pick up the B-52's conventional weapons capabilities, the result could limit the B-1 to a nuclear-only role. In a six-month study from June through November 1994, B-1 sortie rates

were nearing the desired goal of 75 percent, which reflected an improvement of nearly 20 percent over previous rates. This fact, coupled with improved conventional weapon capabilities, could be another key issue in the debate to fund older bombers while simultaneously improving the modern bomber platforms.

A conflict requiring the use of nuclear weapons appears most unlikely due to the end of the Cold War. Contingency planners will require bomber forces to have extensive conventional capabilities to carry out their missions.

Similar concerns surround the B-2 bomber's capability to augment the bomber force in a conventional role. The 20 authorized bomber aircraft are not currently available, and have not been certified for conventional weapons releases. Should operational testing reveal problems in weapon release capability, additional time to resolve the problem will further reduce the total assets available to accomplish the conventional mission. This time could prove crucial in the event the U.S. incurs bomber asset losses during a conflict.

Budget constraints and priorities in program funding also influence the direction in which program support dollars flow. Conflicts in acquisition funding priorities among tactical fighter aircraft, bomber aircraft, and modern munitions may indicate an imbalance in favor of a particular line of systems. Thus, proponents of fighter aircraft or modern munitions may have acquired more of the budget at the expense of bomber modernization and support. This thesis will examine funding priorities in an attempt to draw a correlation

between fighter, bomber, or munitions emphasis. Chapter 5 contains the aforementioned analysis.

The final analytical question is: If defense planners need 184 bombers to accomplish missions called for in the two MRC strategies, should the B-52G augment the B-52H in the desired bomber force structure mix? A key variable to this equation is the role the B-1 must play in the conventional arena. If the B-1 attains its conventional weapon certifications, then 96 aircraft are available to augment 95 B-52Hs, a total of 191 bombers with conventional capability. With Congress having funded 20 B-2 aircraft to add to the mix, a grand total of 211 bomber aircraft would exist, not including the B-52G. Presently, officials have not certified the B-1 for all conventional weapons, and none of the B-2s are initial operations capable. Therefore, planners may not be able to count on the B-1 for use in a conventional configuration, and the initial B-2 squadron is not scheduled to become operational until sometime in 1997. Currently, only the B-52G and H models are present for use to support the two MRC strategy.

If the answer to the question of whether or not to augment the bomber force with B-52G is yes, then the bomber force mix baselined in the BUR could be an invalid recommendation. If the answer is no, then the BUR recommendation is valid to support the two MRC strategy.

This thesis concludes by assessing the operational and tactical implications of the current U.S. global strategy if the B-52G should augment the bomber force, but is not available due to retirement. The chapter summarizes information and analysis and provides rationale for defense planners as they decide future heavy bomber force structure

requirements. The thesis will provide recommendations for further study. Research and data provided during the course of this thesis is sufficient to answer the primary and secondary questions this thesis raises.

## CHAPTER 4

### HISTORICAL ANALYSIS

This chapter examines the need for heavy bombers in the current national defense strategy by conducting a historical analysis of the B-52 during the Vietnam War, and assessing its contribution to the successful outcome of Operation DESERT STORM. The significance of these areas of emphasis is that Southwest Asia and Northeast Asia, identified as likely locations for potential conflict in today's environment, mirror similar concerns expressed during the post-Vietnam era.

#### The Battle of An Loc, April 1972

The B-52 played a key role in this four-month battle involving three North Vietnamese divisions against South Vietnamese defenders and U.S. Army advisers. During the course of this battle, both sides suffered tremendous losses resulting in the blocking of North Vietnamese movement towards the South Vietnamese capital of Saigon.<sup>30</sup> "American advisers on the ground, working in consonance with American air power, would prove to be key ingredients to the South Vietnamese victory."<sup>31</sup> This battle, and the Linebacker missions later in the year, provide insight to ability of the B-52 to significantly alter the nature of a campaign, yet the end results are hard to measure.

The U.S. assisted victory by the South Vietnamese, helped legitimize former President Richard Nixon's policy of Vietnamization of the war. This was an important event influencing world opinion that



"appeared to offer clear proof the President's policy of turning the war over to the South Vietnamese was working."<sup>32</sup> This policy sought to quell U.S. fears that it was losing the war, prevent wide-spread domestic dissension, and calm world leader fears that the U.S. was ineffective against North Vietnam.

The American contribution came from two primary areas: "U.S. air power effectiveness and the role provided by American combat advisers on the ground in and around An Loc."<sup>33</sup> B-52s initially assumed a strategic target role during early missions, but planners began to use them more and more in tactical support roles during missions code-named Arc Light. "The tactical air support was considered so critical that the city (Saigon) would have fallen before May 1 without it."<sup>34</sup> One after action analysis of the impact of air power on defeating the North Vietnamese came from Brigadier General McGiffert, Third Regional Assistance Command Deputy Commander, who said that the B-52 force was "the most effective weapon we have been able to muster" and asserted that the threat of bomber strikes "forces the enemy to break up his ground elements into small units and makes it difficult to mass forces for an attack."<sup>35</sup> Following the war, South Vietnamese General Cao Van Vien wrote,

The tremendous firepower unleashed by the USAF, especially B-52 strikes, effectively blunted all enemy efforts on three fronts, disrupted enemy supply lines, and helped RVNAF conserve their ground forces. It also gave the RVNAF much needed respite to recover from the initial enemy shock, consolidate their lines of defense, and regroup for the counterattack. Without this support, the attack would have been impossible.<sup>36</sup>

A total of 262 B-52 missions (each carrying up to 108 MK-82 500-pound conventional bombs) and 9,203 tactical air strikes were flown against the North Vietnamese in An Loc during the four month battle.<sup>37</sup>

The bomber sorties launched missions from Thailand and Guam, originating from a total bomber inventory of approximately 500 aircraft.

Many of the B-52 missions required striking targets as close as 600 meters to friendly positions.<sup>38</sup> These targets included troop concentrations, supply depots, and transportation networks similar to target categories considered critical in the two MRC strategy. Strikes, such as these, and many others throughout the entire war, were often considered the difference between victory and defeat.<sup>39</sup>

The significance of the bomber's role during this battle represents the magnitude of the bomber platform's effect on the margin of victory. As will be seen in subsequent conflicts, the ability to accurately measure the bomber's performance in quantifiable terms outside of bomb damage assessment (BDA) is quite difficult. However, debriefings of enemy prisoners of war and post-war writings by commanders often describe the invaluable impact the B-52 has had in achieving victory.

#### Linebacker II, 18-29 December 1972

The Linebacker II campaign represents a parallel between the Southwest Asia MRCs of today and the past. During this intensive 11-day campaign, just five months following the Battle of An Loc, B-52s were again used to achieve national objectives designed to bring the North Vietnamese to the bargaining table.

The Linebacker II missions were another of a series of bombing campaigns that featured B-52s. The Linebacker missions, like others before it, were designed to interdict enemy logistics lines and troop concentrations and to bring the North Vietnamese to the bargaining

table. This would enable the U.S. to exit the war in a graceful manner.<sup>40</sup>

During the course of this intensive bombing campaign, B-52s flew 729 sorties and released 15,237 tons of bombs over 34 targets.<sup>41</sup> Sortie flight duration ranged from 3.5 hours for missions generated within the theater, and approximately 12 hours for missions flown from Anderson AFB, Guam.<sup>42</sup> This sortie flight duration reflects similar durations for future missions based on the geographic location of today's likely areas of operations and basing.

Bomber attrition rates during this campaign amounted to just 2 percent (15 bombers) of the total sorties flown. The attrition rate, although small, occurred primarily due to tactics employed during the first few days which called for all aircraft to fly exact routing one behind the other, to open their bomb bay doors as early as two minutes prior to bomb release (which significantly increased the bomber's radar signature for enemy surface-to-air missile (SAM) batteries), and to limit evasive maneuvers before and during bomb release until reaching the post-target turn point. For the first four days, formations of B-52s became easy prey for North Vietnamese air defenses which quickly learned to gauge the anticipated altitudes, airspeeds, and directions the bombers were likely to take. Planners soon changed bomber tactics and routes of flight thus reducing losses on subsequent sorties.<sup>43</sup>

Target categories for the B-52 included a variety of classifications to include railway marshaling yards, airfields, surface-to-air missile (SAM) sites, and command and control facilities. Concern for collateral damage resulted in the creation of stringent tactics and

rules of engagement to minimize damage to civilian concentrations near designated targets.

This campaign is significant because it accomplished the intended objectives which planners created in response to declining public support of the Vietnam War. President Nixon felt the low confidence level exhibited by the American public could ultimately result in Congress stripping away funding for the war effort. With national objectives now focused on getting the North Vietnamese to negotiate in order to allow the U.S. to extract itself from the war, the success of the Linebacker II campaign centered on using the B-52's all-weather capability, large-payload capacity, and long-flight range to destroy North Vietnamese targets. Other aircraft in the inventory did not have the combination of all-weather capability and large weapon payloads. The Navy A-6 and USAF F-111 bombers did participate in Linebacker II, but fighter-bombers other than the B-52s dropped just 25 percent of the total bomb tonnage due to their reduced bomb carriage capability.<sup>44</sup>

Thus, Linebacker II demonstrated during the 1970s the continued reliance on the B-52 to provide massive weapon payload capability. The additional effects of the B-52 as a psychological weapon (as described during the An Loc missions) were also apparent in the Linebacker II missions. Henry Kissinger summarized the B-52's significant performance as a weapon system in both target destruction capability and as a psychological weapon when he stated:

The B-52, in addition to having the right combination of accuracy and capability to destroy targets, also possessed . . . the ability to shock the mind and undermine the [enemy] spirit.<sup>45</sup>

Within five years, the bomber force inventory declined to less than 400 bombers, 25 percent below the bomber fleet inventory used during the Linebacker missions. By 1977, the bomber inventory consisted of 75 B-52Ds, 165 B-52Gs, and 90 B-52Hs.<sup>46</sup> This reduction in bomber resources typifies post-conflict cutbacks after a prolonged war. The FY 1978 defense budget report to the Congress contained budget considerations, recommended Congressional funding priorities, and raised force modernization issues. It also identified potential adversaries likely to engage the U.S. in a future conflict. These issues contributed to reducing bomber inventories and other force resources despite warnings by force planners that a potential major conflict could exist in either Europe or Korea, in conjunction with a minor one in the Middle East.<sup>47</sup>

Thus, as early as 1978, the possibility of U.S. forces engaging in the equivalent of a two MRC strategy required force planners to anticipate the draw on military resources. Key issues emphasized at this time were the importance of U.S. reaction time and timeliness of the response required to confront aggression in any of the potential conflict areas. Missions, such as preventing the loss of key European sea lines of supply and communication, maintaining stability on the Korean peninsula, and preventing the interruption of the oil supply from the Middle East, were predicated on responsive U.S. reaction time.

These same concerns exist for our security interests today, and except for the European scenario, would require a rapid U.S. response, not unlike that envisioned by planners in 1978.

### Operation DESERT STORM

In the 1990s, the B-52 continued to have an important position in the bomber inventory during Operation DESERT STORM. This conflict, commonly referred to as the Gulf War, required the use of B-52s--30 years after its introduction into the bomber force inventory. During the Gulf War, 68 B-52Gs dedicated to the Gulf theater of operations flew more than 1,600 sorties and dropped 72,000 weapons, representing over 27,000 tons of munitions without a combat loss.<sup>48</sup> Major missions included air interdiction against strategic targets, such as Nuclear/Biological/Chemical sites and electrical power facilities; air interdiction against Iraqi forces, and offensive counterair against forward-operating airfields. The aging B-52G platform also set a modern day endurance record for the manned bomber by flying a mission of over 35 hours non-stop during the opening day of the War; returning to its home base of Barksdale Air Force Base, Louisiana, after launching its payload of conventional air launched cruise missiles.<sup>49</sup> "The large payload capability of the B-52 also enabled it to assist breaching operations through enemy ground defenses conducted by Coalition ground forces."<sup>50</sup>

"The B-52 comprised just three percent of the total combat aircraft, yet it delivered 30 percent of the total tonnage of air munitions."<sup>51</sup> Due to the considerable ramp space a B-52 requires, aircrews flew bomber missions from nontheater airfields in the United Kingdom, Spain, and Diego Garcia. These distant bases required three of the four bomber wings to fly missions approaching 14 to 16 hours in duration which directly limited combat sortie rates.<sup>52</sup> The only in-

country airfield used was Jiddah, Saudi Arabia. Again, the B-52s ability to project global power from afar was critical to prosecuting the air war against Iraq during Desert Storm.

As in Vietnam, post conflict debriefings of enemy POWs revealed significant contributions by the B-52 in terms of target destruction, variety of munitions released, and extensive psychological effects on enemy troops subjected to intense aerial bombardment.

Despite the successes experienced by the B-52 in the Gulf War, it did have its limitations. Although the B-52 has a large payload capacity, it does not have an extensive precision-guided munitions capability which limits target selection to large area targets. During this conflict, many targets attacked by the B-52 fit into this category, particularly the Iraqi Republican Guard and the extensive breaching operations through enemy ground defenses. In addition, B-52s participated in dropping 29 million leaflets encouraging Iraqi forces to surrender. Enemy POWs indicated that the leaflets were extremely effective in undermining enemy morale.<sup>53</sup>

The B-52's participation on the initial day of the war required the mission flight profile to include low-level flight altitudes in order to evade enemy air defenses. Since the B-52 lacked then, and still does, stealth technology like that of the B-2, it required a large force protection package (aircraft accompanying the bomber to jam enemy radar and destroy air defense systems) to escort it along missions attacking heavily defended enemy targets.<sup>54</sup>

Another first occurred when B-52s launched 35 conventional ALCMs against targets throughout Iraq which represented the standoff

role the aircraft can accomplish as air defenses eventually prevent the B-52 from more close-in missions.<sup>55</sup> The B-52's lack of stealth characteristics and aging design will continue to require its use at greater distances away from enemy targets in the role of a standoff platform until such time friendly forces achieve air superiority and supremacy. The lack of stealth characteristics will require large force packages to increase its survivability in today's modern and complex air defenses. One example of the force packaging required to support the B-52 was the 38 KC-135 and 19 KC-10 air refueling aircraft needed during the conventional ALCM mission on the first day of the war.<sup>56</sup>

However, the largest aircraft force package during the Gulf War did not include B-52s, but a mixture of 72 F-16s, 8 F-15Cs, 8 F-4Gs, and 2 EF-111s; plus required air refueling aircraft, Airborne Warning and Control System (AWACS), Airborne Battlefield Command and Control Centers (ABCCC), and RC-135 Rivet Joint aircraft to monitor enemy reaction to the attack.<sup>57</sup> Called Package Q, the mission was to strike Baghdad, Iraq, during day three of the war. With air defenses still considered heavy, planners put an air strike package together to ensure a high probability of success while protecting critical, more modern weapon platform resources. As the Gulf conflict continued and Coalition forces achieved air supremacy, aircraft of all types required smaller force protection packages to accomplish their missions.

B-52 operational tactics during DESERT STORM transitioned from low-level to high-altitude flight profiles after enemy defenses were rendered incapable of posing a high-altitude threat. After a B-52 suffered damage at the expense of an SA-3 SAM, planners stopped flying



low-altitude structures and flew at higher altitudes due to the perceived threat of possibly losing a critical aircraft resource. The Central Air Force (CENTAF) Commander did not order B-52s to stop flying low-level operations, but planners were told that CENTAF could not afford to lose a B-52.<sup>58</sup>

Without stealth technology, bombers can still ingress into defended enemy territory, but the effort requires supporting aircraft to provide additional electronic countermeasures, jamming, and removal of surface-to-air missile sites.<sup>59</sup> The B-52 demonstrated it could still penetrate enemy defenses, as evidenced by its use on the first and subsequent days of the war. Only on day four of the war did B-52 operations switch from low-level operations to strictly high-altitude missions. The tradeoff for this change in altitude structure was a decreased accuracy from the B-52s non-precision weapons. However, the B-52's success in spite of this change was still significant. Post-war debriefings identified a significant reduction in enemy morale due to extensive area bombing even without precision weapons. Supporting the issue of retaining non-precision weapons, Eliot Cohen contends, in his article, "The Mystic of U.S. Air Power," "'dumb' (or at least relatively unintelligent) weapons will keep a place" because the newer smart weapons now becoming available may be so specialized that they may lack the flexibility, or may be few in number due to their high cost.<sup>60</sup> Cohen also recognized how B-52 area bombing of Iraqi troops and military-industrial facilities contributed to the undermining of Iraqi troop morale and destruction of its war machine support centers.

Noticeably absent from the Gulf War was the B-1. This bomber platform was relegated to Single Integrated Operations Plan (SIOP) duty in the U.S. while the B-52 served as the conventional workhorse. The reasons for this were many, but two stand out. First, at the time of the Gulf conflict, the B-1 had not earned conventional weapon certification beyond the MK-82 500-pound general purpose bomb. The B-1's lack of certification to release more than this classification of munitions, and the second problem, a questionable electronic countermeasures package, forced planners to rely on the combat-proven B-52.<sup>61</sup>

The B-52s contributed immeasurably to the success of the Gulf War by their ability to demoralize the enemy through high-altitude bombing, dropping propaganda leaflets, launching conventional cruise missiles, and causing massive target destruction with a variety of munitions. Target categories struck by B-52s included chemical storage sites, electrical plants, command, control, and communications (C3), telecommunications, factories, and supply depots in northern Iraq. Additional missions called for strikes against the Iraqi Republican Guard positions and vehicle columns. Requests by Coalition ground commanders for more B-52 strikes during the course of the war demonstrated the B-52's continued utility in the modern battlefield environment.

Given that planners provided only 68 bombers to DESERT STORM, the 14-to-16-hour mission duration which limited sortie availability, and lack of in theater basing, the recommendation by the BUR to have an inventory of 184 bombers appears reasonable and supportable. The Bomber

Roadmap offers a strategy to coincide with the BUR given a two MRC scenario.

Given historical data on sortie generation rates and mission results, the funding of 107 bombers appears to accept a great degree of risk in a nearly simultaneous major regional conflict in North Korea and Iraq. In October 1994, Sadaam Hussein again massed Iraqi troops in a threatening posture towards Kuwait. Almost simultaneous, nuclear proliferation discussions involving North Korea were breaking down. The U.S. immediately began exercising its global projection capability by deploying troops, equipment, and supplies back to a region it had just left after a significant, one-sided military victory two years before. Among the first weapon systems identified to project U.S. resolve were six B-52 and nine B-1 bombers.

#### Summary

This chapter examined three significant involvements of the B-52 in scenarios and geographic locations striking the same classes of targets identified in the current two MRC strategy. The potential conflict areas identified by planners in the 1970s concerning Korea and the Middle East parallel the very same concerns facing today's planners in North Korea and the Persian Gulf. In each time frame, the 1970s and 1990s, planners recognized the need for immediate U.S. responsiveness to threats against national security interests, such as critical lines of communications, flow of oil, and regional stability in the Middle East and on the Korean peninsula. The ability of the U.S. to rapidly project its global power and resolve is paramount to maintaining a credible deterrent force and influence. That force is the heavy bomber.

Given the vast distances U.S. forces and support would have to deploy to sustain a prolonged conflict in a two MRC scenario, the long-range bomber remains an important element of global power projection. A reduced bomber inventory, funded below the 184 bombers recommended as the base-line structure in the BUR, would jeopardize average daily sortie rates and strain U.S. global projection capabilities in regard to bomber forces. Failure by the U.S. to insure an adequate bomber force inventory for future conflicts could prevent the successes enjoyed in past campaigns featuring a more robust bomber inventory.

Its performance in past and more recent conflicts substantiates its role as a global power projection resource. The B-52 is a key component in the military instrument of power and has a definite place in U.S. national defense strategy.

## CHAPTER 5

### BOMBER FORCE STRUCTURE: THE PROPER MIX

This chapter analyzes the bomber force structure recommended in the BUR and explains the current mix of old and new bomber platforms. This analysis includes descriptions and capabilities of the B-52, B-1, and B-2; funding considerations affecting bomber programs; and recent funding trade-offs on existing bomber resources.

In addition to a review of the force structure capabilities, this chapter examines the challenges facing the current mix of bombers. These challenges include B-1 readiness and capability, B-2 IOC, and delays in modern weapons procurement programs designed to augment the force as force multipliers.

The chapter concludes with an examination of the ideal mix of bomber aircraft against that recommended by the BUR and the Bomber Roadmap. This analysis evaluates studies conducted by government sponsored research, independent studies, and historical data.

#### Bottom Up Review Bomber Force Structure

The BUR recommended a bomber force structure based on four broad classes of military operations the U.S. would likely face in future conflicts:

1. Major regional conflicts;
2. Overseas presence--the need for U.S. military force to operate in critical regions;
3. Smaller-scale conflicts or crises that would require

U.S. forces to conduct peace enforcement or intervention operations, and;

4. Deterrence of attacks with weapons of mass destruction(WMD), either against U.S. territory, U.S. forces, or the territory and forces of U.S. allies.<sup>62</sup>

These broad classes of operations establish the foundation by which future force structures will evolve to carry out future U.S. defense strategy. Historically, long-range bombers have held a key place in national defense strategy because of their ability to rapidly project global power. Given the emphasis on attaining a smaller bomber force structure through the remainder of the 1990s, defense officials increasingly rely on advanced modern munitions as force multipliers to augment declining bomber inventories.

One of the force modernization programs designed to provide a force multiplier role for the bomber is the incorporation of munitions enhancements, such as conventional ALCMs, JSOW, and JDAM systems. These advanced munitions will allow increased precision and standoff capabilities and will improve the manned bomber's ability to strike high-value targets, interdict lines of communication, and attack advancing enemy ground forces.<sup>63</sup>

As planners debate the ideal bomber force structure requirements, Senator Sam Nunn, Chairman of the Senate Armed Services Committee, noted data from four independent studies indicated 184-200 bombers as the number required to meet the BUR strategy.<sup>64</sup> These figures represent the minimum number of required bomber resources needed to accomplish assigned missions, provide an allowance for routine maintenance downtime, and offset sortie capability lost due to combat damage and repairs.

To provide force planners the required sortie generation rates to conduct operations in a given MRC, 100 deployable bombers must be made available.<sup>65</sup> This figure originates from the 180-200 operational bombers which allows for approximately 20 percent reduction for aircraft due to "attrition, training, and downtime for maintaining and upgrading the operational fleet."<sup>66</sup>

During a MRC, the 100 bombers operating from bases in the United States, and from forward operating bases nearer the theater of operations, would concentrate bombing efforts for approximately 30 days--the time most analysts believe it will take U.S. forces to gain control of the MRC. After this initial 30-day period, U.S. bombers would be available to rotate into a subsequent MRC starting nearly simultaneously after the first. The remaining 84-120 U.S. bombers would serve in a nuclear deterrent role. The impact of having fewer than 100 deployable bombers becomes apparent when analyzing studies which evaluate MRC strategies in relation to bomber aircraft available.

One such study prepared by Major General Jasper Welch, USAF (Retired), in a paper written for former House Armed Services Committee member Les Aspin, analyzed the effectiveness of differing sizes of bomber force structures against the two MRC strategy. Entering arguments in the study gave bombers credit for optimum sortie rates, and did not reduce sortie capabilities due to maintenance of lack of spare parts.<sup>67</sup> The study evaluated a bomber force consisting of 80 B-52s, 80 B-1s, and 16 B-2s, and capped bomber losses during a two MRC scenario at 25.<sup>68</sup> He contrasted this force against a another comprised of fewer older bombers, but more B-2s. A total of five separate bomber force

structures were evaluated against objectives defense planners hope to achieve during the first 30 days of a MRC. The results of this analysis showed that a force structure containing nearly 120 bombers made up of B-2s, B-1s, and B-52s could accomplish the mission within 31 days--one day longer than ideal.<sup>69</sup> Other bomber force mixtures which contain more B-2s as the force mainstay produce similar results, but the key concern, at present, is the B-2's nonavailability for combat until, at least, 1997.

Another key element to understanding the analysis is the impact the use of PGMs has on accomplishing the objectives in the two MRC strategies. A study conducted by David Ochmanek, a staff member in the Office of the Secretary of Defense and former RAND Corporation analyst, stated that during the Gulf War, approximately 17,000 PGMs were used to strike critical targets. He predicted that 42,000 would be needed in just one future MRC--double that number if two were to occur nearly simultaneously.<sup>70</sup> The significance of these figures is that cruise missiles will play an important part in the execution of a two MRC strategy by nonstealth bombers.<sup>71</sup> Without enough bomber platforms capable of releasing PGMs available over the balance of the 1990s, a potential shortfall in the ability to strike time-critical targets exists.

Ochmanek's study also evaluated the impact of three separate measures of effectiveness by analyzing bomber contributions at 67, 27, and 0 percent of the total bomber precision ordnance delivered during a MRC. He concluded that if bomber inventories are insufficient to support both MRCs, it is conceivable that the duration of an MRC could



be extended from as few as 9-days to as many 42 days dependent upon the percentage of bomber participation.<sup>72</sup>

The bomber forces used in both analyses represent the available primary aircraft authorized (PAA) forces available to fight a conflict, and they take into consideration a 20 percent inventory reduction for the B-1, B-2, and B-52 for maintenance activity and logistical support restrictions.

Although Jasper's study focused on the importance of acquiring more modern bomber systems, such as the B-2, his study compared the economic impact of various combinations of older and newer bomber inventories against the two MRC strategy. His comparison included the feasibility of the continued use of the B-52, albeit a higher operating cost than that of newer bomber platforms, by recognizing its ability to destroy critical aimpoints in the modern battlefield environment.

Given the results of Jasper's study, funding for bomber resources, falling below the 184-200 recommended in the BUR, seriously heightens the risk of limited resource availability during a conflict when maintenance and attrition factors occur. The bomber inventory outlined in the Bomber Roadmap consists of 95 B-52Hs, 95 B-1s, and 20 B-52Gs funded for conventional operations--a total of 210 bombers, 27 more than in the BUR plan. These figures do not include the B-2 in the total inventory because it is not yet IOC. However, planned force structure levels recommended by the BUR, and funded in the FY 95 defense budget, fall well short of the total inventory available that presently exists. The anticipated level of 140 PAA bomber aircraft does not occur until

1999, and funding for them falls over 40 bombers short of the 184 required to support the MRC strategy outlined in the BUR.<sup>73</sup>

The significant difference between recommended and funded bombers leads defense planners and analysts to fear this number will be insufficient to support the mission requirements imposed in the two MRC scenario. Studies, as presented earlier, justify the concern that 107 funded bombers, even if augmented with the additional 20 B-52Gs, are not enough. They are concerned that a failure to rectify low bomber inventories could result in a shortage of bomber resources if a conflict occurred in North Korea and in a second MRC; thus, lengthening an MRC by as much as 15 days beyond the 30 days desired.<sup>74</sup> The Welch study supports this contention based upon a 30-day delay between the start of MRC one and MRC two.

The support of research studies by RAND Corporation, research conducted by a former defense policy coordinator Major General Welch, and concerns expressed by the Senate and House Armed Services Committee members helped to generate an additional \$60 million to keep 10 more B-52s operating in FY 95 for a new budget supporting a total of approximately 120 bombers. This action also prevented Congress from "retiring any currently operational long-range bombers in 1995."<sup>75</sup> The tradeoff continues to be the cost of maintaining the older systems versus procuring newer weapons during the remainder of the 1990s.

#### Bomber Funding and Risk Acceptance

Bomber funding priorities lag behind other programs due to limited funds promulgated by the post-Cold War military drawdown.

Former Air Force Chief of Staff, General (Retired) Merrill McPeak, told the Senate Armed Services Committee that there was some risk in fighting a two MRC scenario if funding limitations forced deployable bomber forces below the 100 needed.<sup>76</sup> The 100 bombers would represent the deployable force required to fight a conflict, and reflects the majority of the 184 authorized in the BUR. The remaining 84 bombers represent aircraft remaining in CONUS for maintenance, nuclear deterrence, and as spare aircraft to replace those lost to combat losses or attrition. General McPeak also said officials based the current bomber force structure on the ability to destroy time-critical targets early in a MRC scenario--the emphasis being on quality, not quantity.<sup>77</sup>

Despite the perception of the inability of the bomber to contribute effectively during the first few days of the conflict, McPeak recognized the need for a bomber force in excess of the 107 initially funded in the FY 95 Defense budget. He claimed the Air Force was directed to take some risk in meeting a national strategy based on winning two major regional conflicts, so the Air Force chose to reduce the B-52H portion of the bomber force due to its lack of precision-bombing capability.<sup>78</sup> However, in recognizing the limitations of accepting risk at the expense of the bomber force, General McPeak said that the development of precision-guided munitions for bombers, by the end of the decade, would help alleviate the detrimental effect of the reduced number of bombers now.<sup>79</sup> By this, he indicated that once the PGMs came into the inventory, additional funding could then be put back into the bomber force.

Current funding initiatives for precision-guided munitions on the B-1 and B-2 include the JDAM, JSOW, and TSSAM.<sup>80</sup> In January 1995, Congress canceled procurement funding for the TSSAM, although they retained some funding for its continued study.<sup>81</sup> Easing the effects of the apparent cancellation of the TSSAM are other weapons scheduled for delivery in the late 1990s. However, these new weapons will not be available for use in large numbers until early in the year 2000, creating a gap between existing and future capabilities over the next five years.<sup>82</sup> Despite the gap in timing between PGM availability and the reduced bomber force structure, defense officials continue to move forward with the PGM acquisition. The concern by planners today is, what happens if the U.S. engages in a two MRC scenario during this period of transition, and both bombers and PGMs are in short supply?

#### Challenges Facing the Current Bomber Mix

##### B-2 Update

The BUR predicates its baseline bomber force on a timetable stretching until 1999. It projects having 7 B-2 aircraft by 1995 and 12 by 1997. As of mid-FY 95, only 4 B-2 aircraft are available, and none have received conventional weapon release certification. B-2 maintenance is currently averaging nearly 80 hours per flight hour to repair problems associated with the new weapon system.<sup>83</sup> Once it reaches IOC and completes its full compliment of weapon certification requirements, it will provide the necessary additional support to the aging bomber fleet. At present, it cannot fulfill the requirements of the heavy bomber mission.

### B-1 Characteristics

The next bomber platform making up over 50 percent of the planned bomber force into the late 1990s, the B-1, was noticeably absent from the Gulf War. The main reasons for its absence were that the system lacked spare parts, served in the role of a nuclear deterrent force, and did not have conventional weapon certification to drop munitions other than the MK-82 500-pound iron bomb. Since the Persian Gulf War, the B-1 has participated in a number of exercises to demonstrate that the existing fleet of 95 B-1s can take over the conventional mission dominated by the B-52. In a Congressionally mandated study, the B-1 achieved high marks during an intense 6-month evaluation of the bomber's ability to maintain at least a 75 percent mission capable rate given 100 percent funding for spare parts and manpower.

The purpose of this test was to see if the B-1 could attain, and maintain, mission capable rates exceeding the 56 percent that it routinely experienced during routine training operations tempo.<sup>84</sup> According to Lieutenant General Stephen Croker, Commander, Eighth Air Force, part of the problem causing the lower mission capable rates was budget constraints imposed upon the B-1 program that provided just enough funds to support flying 65 out of 95 total planes.<sup>85</sup> With the provision for a full compliment of spare parts and manpower, the B-1 achieved mission capable rates exceeding the 75 percent target rate, at times reaching 85 percent.<sup>86</sup>

Providing a full compliment of spare parts and maintenance support for the test aircraft developed at the expense of non-test

aircraft. B-1 spare parts came from aircraft at bases not involved in the testing, resulting in mission capable rates of 58 percent at those locations--well below the percentage the mandated test was to achieve.<sup>87</sup> B-1 officials contend, however, that full funding for the entire fleet will enable the B-1 to meet the desired mission capable rates as shown during the 6-month test. Also improving the B-1's maintenance record was the closing of one of four B-1 bases, and the consolidation of closed base's maintenance operations at the remaining three. This had the effect of reducing flight turn-a-round times, thus increasing mission capable rates.

#### The B-52

The third component of the planned bomber force structure in the BUR is the B-52. Still capable of dropping the vast majority of conventional weapons in the USAF non-precision weapon category, FY-95 funding considerations reduced the planned primary aircraft authorized from 64 B-52Hs to 40, and remains constant into FY-1999. The main challenges facing attempts to hold onto the B-52 are its age and lack of stealth technology which requires planners to provide sizable force packaging to protect it against enemy defenses.

However, the B-52's performance during the Gulf War, flying over 1,600 sorties without a single loss attributed to combat, reemphasizes the historical operational importance this platform still provides to national defense. Until the B-2 becomes operational in the late 1990s, and until the B-1 passes the test of combat, the B-52 remains the only proven long-range bomber available to deter aggression.

The Senate and House Armed Services Committees recognized this important attribute when it stopped retiring B-52Gs, and other operational long-range bombers, until improvements in the B-1 and the availability of more B-2s ease the forecasted bomber shortage. Planners expect this shortage to linger until the end of the decade until PGMs arrive. The B-52 is old, needs a capable replacement, and should be retired--eventually. But, until follow-on bombers can demonstrate commensurate capabilities, B-52G and H models should remain available to augment the existing inventory to satisfy the requirements of the BUR for the remainder of the 1990s.

#### The Ideal Mix for the Late 1990s

Several studies conducted by research groups, former government officials, and scholars have advocated having a modern bomber to replace the B-52 and augment the B-1. The B-2 is the selected replacement, but this system will not be operational in the numbers required to provide the necessary force augmentation until the late 1990s. Only 12 are forecast by 1999.<sup>88</sup> Original B-2 acquisition plans called for 132 aircraft, but budget constraints reduced this number to 20. With only 95 B-1s, 95 B-52Hs, and 20 conventional B-52Gs remaining, the force structure recommended by the Bomber Roadmap is the most feasible over the short term because the B-52G and H still exist in sufficient numbers to warrant continued funding for operations until the B-2 becomes operational. As demonstrated during the Gulf War, the B-52 can still participate on the first day of a modern battlefield environment, and survive.

Take the Bomber Roadmap's total bomber inventory of 210 bombers, which includes 20 B-2 bombers, and reduce it by 20 percent to reflect the number of aircraft normally made unavailable due to maintenance, or 178, then the main reason to maintain existing inventories of B-52Gs and B-52Hs becomes evident despite the fact they are no longer considered PAA under the constraints of the Bottom-up Review.

A larger number of bomber aircraft is a key planning factor for winning a two MRC scenario. Planners have identified 1,100 essential targets in each of the planned MRC whose destruction greatly enhances U.S. opportunity for victory. More bombers mean a greater chance of success in destroying at least 75 percent of these 1,100 critical targets.<sup>89</sup> Of these 1,100 targets, 25 percent are time-critical targets consisting of command, control, communications, and intelligence (C<sup>3</sup>I), radar sites, and leadership facilities.<sup>90</sup> Striking these targets is important to gaining control of one MRC, and it is even more significant if another MRC is imminent. Post-Gulf War reports show that B-52s struck eight such targets on the first day of the Gulf War using conventional ALCMs demonstrating the impact that older platforms can still have early in a conflict. Other B-52 sorties flew low-level sorties for four days against similar time-critical targets before planners restricted flights to higher altitudes. Without the B-52, the time required to destroy these targets, in future conflicts, would take longer, and place success in the second MRC in jeopardy.



### Summary

The desired bomber force structure recommended in the BUR contradicts itself. The recommended force of up to 184 bombers by 1999 received funding for just 107 PAA aircraft in FY 95. The two MRC scenario requires 100 deployable bomber aircraft to support mission requirements over the duration of the conflict. Given the 20 percent planning factor for maintenance of PAA aircraft at any time, only 86 aircraft would be available, at current funding authorizations, out of the 107 authorized. Despite Congress authorizing \$60 million for 10 additional B-52 aircraft during FY 95, less than 100 bombers would be available after factoring in the 20 percent nonavailability rate. Thus, this latest boost to the small bomber inventory still jeopardizes the potential for mission success during any possible MRC. Compounding the dilemma, the B-1 still has problems with its electronic countermeasures equipment, and it has not yet performed in an actual combat environment. Therefore, it is conceivable that the 95 B-1s could be a less effective component of the inventory than originally thought.

As impressive as the just-concluded B-1 test results may be, the B-52 must still bear the brunt of the conventional mission until the B-2 becomes completely operational. Even then, Congress has only authorized 20 platforms.

In conclusion, the proper mix of aircraft must include the approximately 20 remaining conventional B-52Gs, 95 B-52Hs, 95 B-1s, and all available B-2s. This mix reflects the force outlined in the Bomber Roadmap and adds remaining B-52Gs to the forecast inventory until modern replacements become fully combat operational. The addition of the B-52G

also helps leverage against potential delays in the acquisition of PGMs due to unforeseen economic crises.

## CHAPTER 6

### AUGMENTING THE BOMBER FLEET

#### Bottom-up Review Force Structure

The current bomber force structure is not a permanent number, but a figure subject to frequent change and driven by balancing budget considerations against U.S. capability to win a two MRC scenario. Bomber forces numbered the following during FY 1991 and are projected for 1997 using information contained in the BUR:

#### U.S. STRATEGIC FORCES, DECEMBER 1990 PROJECTED TO FY 97

Aircraft Type	FY 1991	FY 1994	FY 1995	FY 1996	FY 1997
BOMBERS (ALCM)					
B-52G	77	0	10*		
B-52H	95	64	40	40	40
B-1	95	84	60	60	60
B-2	N/A	4	7	11	12
TOTALS	267	152	117	111	112

Source: BUR, Table V-12, p. 187 and American Defense Annual, 1991-1992, Fig 4-1, p. 71.

\*Funding for 10-24 additional B-52Gs authorized for FY 95.

Budget considerations have forced reductions across all areas of the defense establishment. Decisions to continue certain programs have meant setting priorities based on present and future defense needs with no system getting a disproportionate reduction in procurement. The budget constraints imposed by Congress have required cutbacks in the

procurement of fighter forces approaching 50 percent; while bomber forces have seen their procurement funding reduced by just 30 percent.<sup>91</sup> Frank Miller, Principal Deputy Assistant Secretary of Defense for International Security Policy, acknowledged that the reduction in bomber force numbers was made in response to budget pressures to free additional money to continue operating F-111s.<sup>92</sup> In an attempt to prevent continued reduction of the bomber force, government officials appropriated \$75 million to help preserve the B-2 industrial base to keep production lines available in the event Congress approves additional B-2s beyond the 20 presently authorized.<sup>93</sup> This offers additional evidence that government officials are cognizant of the detrimental effect a reduced bomber force may have on overall force readiness, and Congress is funding efforts that will prevent a catastrophic shortfall in bomber resources.

The BUR regards the use of bombers in a future conflict in the following manner:

In the future, the long-range capability provided by bombers could make them the first heavy weapon system on the scene in a rapidly developing crisis particularly in regions where the United States does not routinely maintain forces. The current and programmed capabilities of the bomber force will ensure it remains a very flexible and responsive striking force that compliments land- and sea-based fighter/attack forces.<sup>94</sup>

As the only long-range bomber platform used during the Gulf War, the B-52's mission capable rates exceeded 80 percent throughout the war, despite not having prepositioned war readiness spares kits (WRSK) in theater.<sup>95</sup> This problem was complicated by a lack of in-theater bases for B-52 operations, but it did not adversely affect sortie availability. The significance of the B-52's 80 percent mission capable

rate is evident when contrasted against the B-1's 75 percent during tests concluded in December 1994. The main difference between the two is that the B-52 achieved its performance standards in an actual combat environment, whereas the B-1 performed its results within a test environment simulating combat conditions. Should a conflict arise before the B-1 can assume the conventional workhorse role previously handled by the B-52, then the potential exists to have a reduced conventional capability unless officials retain existing B-52Gs as an operational supplement to B-52Hs and B-1s.

#### More Planes or Precision-Guided Munitions?

Air Force officials have openly admitted to accepting risk in determining the appropriate balance of USAF assets. With limited appropriations, funding for modern precision-guided weapons have been the priority. General John Michael Loh, commander of Air Combat Command, stated the all-weather PGMs currently under procurement, ". . . will give us enormous leverage in enabling us to take out high value targets in the numbers that we'd need to take out early on."<sup>96</sup>

The number of PGMs quantifying this capability exist in the following statistics: 74,000 JDAM kits for existing 1,000- and 2,000-pound bombs and 22,000 JSOW munitions containing combined effect munitions, antiarmor submunitions, and unitary warheads are presently on order.<sup>97</sup> These munitions provide all bombers and strike fighters the capability to take out the time-critical targets so important in defeating an aggressor in a MRC scenario. The main problem facing planners is that these advanced munitions will be in limited supply by

1998, with complete inventories not expected until the turn of the century.<sup>98</sup> Therefore, the lack of precision munitions designed to enhance the bomber as a force multiplier will not be available in sufficient numbers to accomplish the objective it was designed for.

Funding for the TSSAM system suffered cuts reducing expenditure for this program from \$600 million to \$300; thus taking it out of procurement status. For all intents and purposes, the TSSAM will not be a program available to augment the bomber platform, but funds freed by this action will permit acquisition of other programs already in existence such as the conventional ALCM.<sup>99</sup>

To assist the B-52 with high-altitude bomb release parameters, such as those experienced during the Gulf War, and to insure increased accuracy, the Air Force plans to modify over 40,000 existing tactical munitions dispensers with new inertial guidance units, movable tailfins, and a signal processor called wind corrected munitions dispensers (WCMDs).<sup>100</sup> These programs will greatly enhance the effectiveness of all weapon systems releasing what were once considered "dumb bombs." Officials have yet to choose a contractor to enact this program; thus a great opportunity to add a force multiplier to the bomber force is forthcoming, but the capability will not be available for some time.

The key resources behind the effectiveness of PGMs include more than just the weapon itself. The availability of the Global Positioning System (GPS) in the airplanes destined to receive PGMs and ensuring computer software compatibility between the weapon system, the weapon, and the GPS all require time to perfect. According to Major General Larry L. Henry, Director of Operational Requirements in the office of

the Air Force Deputy Chief of Staff for Plans and Operations, the Air Force received direction to place GPS in all its aircraft by the year 2000; and he said, "I think we'll be close."<sup>101</sup> This infers at least five years before the USAF achieves the deadline.

#### The B-52 As An Alternative

Recognizing the delays in PGM programs facing the USAF, the Senate Armed Services Committee decided to halt the retirement of the B-52G which began in late 1993, and provided an additional \$60 million in operating funds for FY 95 in a proactive stance to increase bomber availability in the event of a major regional conflict. This appropriation provides support for as few as 10, and as many as 24 additional aircraft. It also supplements the additional \$75 million allotted to ensure the B-2 assembly line remains capable of producing additional B-2s.

General McPeak stated that the bomber force would place second in priority to the procurement of advanced munitions until the end of the century. Then, the emphasis would return to eliminating deficiencies in the bomber program by combining newer aircraft with improved munitions designed to compliment existing strike fighters. This force would then be able to strike hard, and with precision, the 1,100 time-critical targets key to winning an MRC. It is now mid-FY 95, future weapon programs including JDAM, JSOW, and WCMDs will not be available until 1998, and full availability will not occur until 1999, 2000, and beyond. The five-year span between today and full program

availability leaves a gap between the 184 bombers needed in the BUR and the 120 bombers currently funded.

The B-52G can fill this gap in the interim; while existing spare parts, trained air crews, and maintenance personnel familiar with B-52 operations exist in sufficient numbers. Attempting to resurrect a "mothballed" or "retired" system would entail a great deal of time, which may not be available, if the "unretiring" takes place after a contingency erupts.

Similarly, restarting the B-2 assembly line following the production of the 20th B-2 could entail a lead-time of up to one year to produce more B-2s.<sup>102</sup>

In response to doubts regarding the two MRC strategy, Congress directed Secretary of Defense William Perry to reexamine the planned force structure's personnel figures, the \$1.2 trillion defense budget, and the two MRC strategy.<sup>103</sup> In addition, a committee is also examining the armed services' roles and missions in order to streamline operations and maximize defense dollars in the wake of declining budgets. Changes, if any, in roles and missions will not be known until sometime in June 1995 but, for now, Congress continues to debate changes in funding allocations for bomber forces. Given the additional operating funds for the B-52G, Congress is attentive to the importance of a viable bomber force.

#### Summary

This chapter examined the benefits of the existing policy as presented in the BUR and compared it with the need to augment the existing bomber force with all remaining B-52Gs programmed for



retirement or placed in attrition reserve. This augmentation is necessary due to the delay in procurement of advanced PGMs in amounts necessary to make the bomber force capable of being a force multiplier during a two MRC scenario.

The B-52G exists in sufficient numbers when combined with those aircraft currently placed in attrition reserve status, and would effectively enhance the force outlined in the BUR. Augmenting the force pending IOC of the B-2 and the B-1 attaining full conventional capability is a prudent decision given the B-1s lack of combat experience. Until the Air Force can be certain of the B-1's combat capability, and provided the B-2 can be IOC by its prescribed timetable, the decision should be to incorporate the B-52 into the present bomber mix until it can no longer be effective in combat.

## CHAPTER 7

### CONCLUSIONS

This thesis examined the position the B-52 has filled in support of our national security objectives and deterrence. The B-52's legacy as a combat-tested performer is unmatched by any existing bomber in the inventory. From campaigns during the Vietnam War to Operation DESERT STORM, the B-52 remains the only long-range bomber to participate in combat. This chapter evaluates the results obtained through the analysis of the research questions contained in chapters 4, 5, and 6. The chapter concludes with recommendations for further study.

#### Question One

The B-52 served as the mainstay of the long-range bomber force since its inception into the inventory in the late 1950s. This thesis examined three significant operations involving the B-52 which parallel in location and target makeup the anticipated MRC scenarios outlined in the Bottom-up Review. It is clear that force planners must have adequate bomber resources to project U.S. resolve rapidly, and over great distances in order to insure the same degree of success experienced in past conflicts.

Each of the last two conflicts that required heavy bombers, Vietnam and the Persian Gulf Wars, occurred in regions which mirror the scenario envisioned in the BUR. These areas, Northeast and Southwest Asia, required bomber forces dedicated to achieving national security

objectives, such as insuring the continued flow of oil and protecting critical lines of communication. They also struck critical targets, such as command and control facilities, leadership, and electric power complexes that require destruction in virtually any type of conventional conflict.

As recently as October 1994, U.S. forces were again deployed to the Southwest Asia region in response to renewed Iraqi aggression aimed at intimidating U.S. allies, Kuwait and Saudi Arabia. To prevent a potentially destabilizing incident in the region, the U.S. placed heavy bombers on alert, including 6 B-52s and 9 B-1s. This immediate response demonstrated our global force projection capability and resulted in an Iraqi withdrawal.

Political concerns and national security interests during the Persian Gulf conflict were similar to those during Vietnam in that the American public did not want a prolonged involvement, nor would they tolerate unnecessary American casualties. The war required the use of heavy bombers in order to speed the massive destruction of Iraqi forces and infrastructure. The 68 bombers made available to force planners during DESERT STORM paled in comparison to the larger inventories available during the Vietnam era, yet the results were equally as impressive, if not more so. The enemy suffered great psychological damage (according to debriefings of enemy POWs) as well as physical damage, and Allied commanders requested more B-52 strikes than were available.

During the Linebacker II missions in Vietnam, the U.S. lost only 15 B-52s out of 729 total sorties flown, a 2 percent attrition

rate. During the Gulf War, over 1,600 combat sorties flew without a loss attributed to combat. Sorties flew on the first day of, and continued, throughout the war. Flight profiles included both low and high altitudes. B-52s released over 27,000 tons of weapons of different categories on strategic and tactical targets. Although it represented only 3 percent of the total combat aircraft, the B-52 released 30 percent of the total tonnage of air munitions.

The B-1 has not participated in any combat to date due to equipment limitations and lack of spare parts brought about by reduced funding. Since the B-1 is to be the conventional work horse for future conflicts, it must be able to accomplish the role long held by the B-52. The bomber is critical to global power projection and has a definite part in national defense strategy.

#### Question Two

The need for a heavy bomber continues to exist to support national defense strategies. The Bottom-up Review identifies 184 bombers to achieve success in a two MRC strategy; yet the same report stated there would only be funding for 107 in FY 95 and 112 through FY 97. This contrasts with the Bomber Roadmap which recommended a funded force structure of 210 bombers. Air Force leaders and planners are willing to accept between 150-184 bombers to ensure that 100 deployable bombers are available for a contingency, but the debate as to exactly how many bombers Congress should fund continues.

This thesis contends the 184 bombers recommended by the BUR can satisfy the two MRC requirements contingent on the full funding of the

184 PAA required. The acceptance of 184 bombers is also contingent on the B-1 being able to fulfill its contingency commitments. Funding for 107 PAA would not satisfy current planner needs because 107 aircraft can not provide the 100 deployable aircraft required to strike the 1,100 time-critical targets during a MRC.

Concurrently, the B-2 is not yet operational and is not expected to become IOC until 1996. Therefore, the B-2's stealth technology, which requires smaller force packaging than older aircraft, cannot immediately relieve the conventional burden borne by the B-52. Congress recognizes this issue and authorized the additional appropriation of \$60 million to support 10-24 B-52Gs in the FY 95 defense budget.

The additional funding may not be enough. The Air Force has accepted risk by funding fewer bombers at the expense of greater funding for advanced PGMs. The risk occurs during the time the new weapons take to arrive through the procurement process. The current set of funded PGMs will not arrive for three to five years--at the earliest. This leaves a significant gap between the bomber force now available and the advanced PGMs that will eventually serve as force multipliers.

The answer, then, is to accept the planned bomber force recommended in the Bomber Roadmap which is comprised of 95 B-52Hs, 95 B-1s, and 20 B-2s.

### Question Three

The B-52G should augment the planned force recommended in the BUR to bridge the gap between it and the Bomber Roadmap. This weapon

system still exists in sufficient numbers, has trained air crews, and retains a sufficient maintenance force familiar with its equipment and operations. This thesis does not recommend the B-52 continue on forever, but it does recommend that Congress and Air Force leaders fill the gap created by poor timing in the acquisition of PGMs. Due to declining defense budgets, the choice to procure advanced munitions at the expense of the bomber force should be met with the understanding that the risk involved may not be worth the choice made over the short term. The unproved B-1, and presently unavailable B-2, represent the extent of the risk taken by Air Force leaders in that they could not successfully participate in a MRC to the same degree of effectiveness as the B-52. PGMs in procurement status designed to improve bomber performance will not arrive until 1998 at the earliest. This entails accepting a greater risk for at least the next three to five years until the PGMs arrive.

#### Thesis Question Revisited

What are the operational or tactical implications impacting the current U.S. global strategy if the U.S. retires B-52G heavy bombers and is unable to meet the BUR baseline requirements for 184 bomber aircraft?

#### Thesis Question Answered

The continued retirement of B-52G aircraft would leave a significant gap in U.S. ability to employ global power projection. One tactical implication of such a gap is an increased risk of failing to strike many of the 1,100 critical targets deemed necessary to defeat an opponent within an MRC. In regard to operational implications, the

outbreak of a second MRC without neutralizing the enemy in the first MRC could result in a protracted conflict that requires an expenditure of greater resources than are presently available. Understandably, the time frame between the outbreaks of the two MRCs is an important variable with regard to planned success.

With bomber force structures predicated on the 184 outlined in the BUR, the proven B-52 must remain available in the event the B-1 cannot fulfill its conventional responsibilities. Recent tests proved the B-1 could maintain a 75 percent mission capable rate, but a lack of weapon certifications for other than the Mk-82 500-pound bomb and ECM problems could hamper the B-1s ability to ingress to the target area in a combat environment. Even if the newer PGMs arrive on schedule to enhance existing bomber force capability, there is a three to five year period of uncertainty if a MRC scenario develops.

The B-52G can temporarily resolve this uncertainty for the remainder of the 1990s until such time the B-1 and B-2 become established in their future roles.

#### Recommendations for Further Study

This thesis examined a very complex, and budget driven, process to determine the proper bomber mix needed to support contingencies outlined in the BUR. Additional concerns that relate directly to this topic are ongoing discussions concerning the services' future roles and missions, technological developments for new and existing weapon systems, and whether or not a significant world threat exists to

challenge the United States in a future conflict. These subjects should be the focus of further study.

Moreover, the current mandated procurement ceiling of 20 B-2 bombers raises significant concerns: Is stealth technology so good that 20 bombers are all that is required? If the B-1 cannot replace the B-52's conventional weapon legacy, can the B-2? If the B-2 has to take over conventional responsibilities, how many losses do experts believe the B-2 will experience due to attrition, combat losses, and maintenance failures? If losses do occur, at what point will decision makers have to develop or produce additional long-range bombers. Finally, if bombers are becoming obsolete, what weapon system should replace its capabilities so often feared by our prior enemies?

Given the reduced defense budgets which accompany typical force reductions at the conclusion of major conflicts, economic considerations face defense planners as they prioritize the weapon systems for the future. This raises still more areas for additional research, such as: Can the current U.S. defense strategy withstand the economic impact of high cost, one-time-use-only precision-guided weapons? Similarly, how do the increased reliance on PGMs (TLAM, JDAM, JSOW, etc.) impact the current defense strategy over the next 10 years as bomber forces decrease? Finally, what weapon system can fill the void left by the retirement of the B-52 which provides similar flexibility, capability, and reliability?

These, and other related issues, require research to explore the options facing defense planners in the face of an aging bomber fleet, with few replacements currently available.



## ENDNOTES

### Chapter 1

<sup>1</sup>David A. Fulghum and John D. Morrocco, "Deutch Demands Cuts, Services Scramble Anew," Aviation Week & Space Technology, 29 August 1994, 22.

<sup>2</sup>John T. Correll, "The High Risk Military Strategy," Air Force Magazine, September 1994, 38.

<sup>3</sup>James W. Cannon, "New Life for the B-2?" Air Force Magazine, August 1994, 10.

<sup>4</sup>Department of the Air Force, The Bomber Roadmap, (Washington, D.C.: U.S. Government Printing Office, 1992), 6.

<sup>5</sup>Department of Defense, "Report of the Secretary of Defense to the President and the Congress," (Washington, D.C.: U.S. Government Printing Office, 1994), 27.

<sup>6</sup>Earl H. Tilford, Jr., Setup: What the Air Force Did in Vietnam and Why (Maxwell, AL: Air University Press, 1984), 263.

<sup>7</sup>Ibid.

<sup>8</sup>Henry Kissinger, The White House Years (Boston: Little, Brown, 1979), 1099-1100.

<sup>9</sup>H. Norman Schwarzkopf with Peter Petre, It Doesn't Take A Hero (New York: Bantam Books, 1992), 320.

<sup>10</sup>Ibid.

<sup>11</sup>Ibid., 319

<sup>12</sup>Steve Watkins, "B1-B Surpasses Goals of Test, Service Says," Air Force Times, 29 August 1994, 30.

<sup>13</sup>United States. "B-2 Bomber: Comparison of Operational Capabilities and Support Costs for 15 Versus 20 Aircraft," United States Government General Accounting Office, (Washington, D.C.: GPO, August 1993), 3.

<sup>14</sup>Brian Green, "The Bomber Debate Continues," Air Force Magazine, August 1994, 9.

<sup>15</sup>Kent M. Monroe, Paul A. Maye, and Walter E. Webb, Employment of the Manned Strategic Bomber in Nonnuclear War: A Perspective (Maxwell AFB, AL: Air University Press, 1978), 70.

<sup>16</sup>Department of the Air Force, The Bomber Roadmap, June 1992, 6.

<sup>17</sup>Christopher Bowie, Fred Frostic, Kevin Lewis, John Lund, David Ochmanek, and Philip Propper. The New Calculus: Analyzing Airpower's

Changing Role in Joint Theater Campaigns. (RAND Corporation, Santa Monica, CA: 1993), 44.

<sup>18</sup>The Bomber Roadmap, 6.

<sup>19</sup>Julie Bird, "Back to the Gulf," Air Force Times, 24 October 1994, 15.

## Chapter 2

<sup>20</sup>Green, 9.

<sup>21</sup>Jasper Welch, "Bomber Forces for Cold Start Conflict," Air Force Magazine, December 1994, 28.

<sup>22</sup>Richard G. Meck, "Strategic Bombers in a Flexible Response Strategy," (Newport, RI: Naval War College Press, 1986), 19.

<sup>23</sup>V. Frank Vollmar, The Conventional Bomber Force: War-Horses for Global Conflicts (Maxwell AFB, AL: Air University Press, 1992), iv.

<sup>24</sup>John Morrocco, "McPeak Defends Bomber Plan," Aviation Week and Space Technology, 21 Mar 1994, 29.

<sup>25</sup>Ibid.

<sup>26</sup>Green, 9.

## Chapter 3

<sup>27</sup>Tilford, 253.

<sup>28</sup>Vollmar, iv.

<sup>29</sup>BUR, 27.

## Chapter 4

<sup>30</sup>James H. Willibanks, Lt Colonel, USA., Thiet Gap! The Battle of An Loc, April 1972. Combat Studies Institute, U.S. Army Command and General Staff College, Fort Leavenworth, Kansas, 1993, 1.

<sup>31</sup>Ibid., 60.

<sup>32</sup>Ibid., 61.

<sup>33</sup>Ibid., 63.

<sup>34</sup>Ibid.

<sup>35</sup>Ibid.

<sup>36</sup>Ibid., 64

<sup>37</sup>Ibid., 53.

<sup>38</sup>Ibid.

<sup>39</sup>Ibid., 31.

<sup>40</sup>Dana J. Johnson, "Roles and Missions for Conventionally Armed Heavy Bombers--An Historical Perspective," RAND Corporation, Santa Monica, CA, 1994, 66.

<sup>41</sup>Tilford, Earl H., Jr., Setup, 263.

<sup>42</sup>Johnson, 74.

<sup>43</sup>Johnson, 80.

<sup>44</sup>Ibid, 263.

<sup>45</sup>Kissinger, The White House Years, 448-91.

<sup>46</sup>Kent M. Monroe, Colonel, USAF, Maye, Paul A., Lt Colonel, USAF, and Webb, Walter E., Lt Colonel, USAF. "Employment of the Manned Strategic Bomber in Nonnuclear War: A Perspective." Maxwell Air Force Base, AL, April 1978, 46.

<sup>47</sup>Ibid., 60.

<sup>48</sup>United States. Conduct of the Persian Gulf War: Final Report to Congress, (Washington, D.C.: GPO, April 1992), Vol III, Appendix T, T-27.

<sup>49</sup>Ibid.

<sup>50</sup>Ibid.

<sup>51</sup>Ibid.

<sup>52</sup>Ibid.

<sup>53</sup>Gulf Air Power Survey, Volume II, Operations and Effectiveness, (Washington, D.C.: GPO, 1993), 250.

<sup>54</sup>Conduct of the Persian Gulf War, T-27.

<sup>55</sup>Ibid., 138.

<sup>56</sup>Ibid., 140.

<sup>57</sup>Ibid., 109.

<sup>58</sup>Ibid., 155.

<sup>59</sup>David Callahan. "Air Power Comes of Age," Technology Review, August 94, Vol 97, Issue 6, 66.

<sup>60</sup>Eliot A. Cohen, "The Mystique of U.S. Air Power," Foreign Affairs, January/February 1994, 116.

<sup>61</sup>James C. Novak, "America's Costliest Fleet of Lemons," The Humanist, March/April 1994, 3.

## Chapter 5

<sup>62</sup>BUR, 11.

<sup>63</sup>Ibid., 18.

<sup>64</sup>Morrocco, "McPeak Defends Bomber Plan." 29.

<sup>65</sup>Ibid.

<sup>66</sup>Correll, 40.

<sup>67</sup>Jasper Welch, "Bomber Forces for Cold Start Conflict," Air Force Magazine, December 1994, 35.

<sup>68</sup>Ibid., 38.

<sup>69</sup>Welch, 34-37.

<sup>70</sup>Ibid., 33

<sup>71</sup>David Ochmanek and John Bordeaux, "The Lion's Share of Power Production," Air Force Magazine, June 1993, 42.

<sup>72</sup>Ibid.

<sup>73</sup>Correll, 34.

<sup>74</sup>Welch, 34.

<sup>75</sup>Ibid., 29.

<sup>76</sup>Morrocco.

<sup>77</sup>Ibid.

<sup>78</sup>Ibid.

<sup>79</sup>Ibid.

<sup>80</sup>David A. Fulghum, "Smart Weapons to Boost Impact of B-1, B-2 Force," Aviation Week and Space Technology, 2 May 94, 48.

<sup>81</sup>Steve Watkins, "Scenario Is Up in the Air," Air Force Times, 26 December 94, 22.

<sup>82</sup>Ibid.

<sup>83</sup>\_\_\_\_\_. "Air Force Prepares to Operate B-2 Bomber," Aviation Week and Space Technology, 13-20 December 93, 28.

<sup>84</sup>Tony Cappacio, "B-1 Success in Readiness Drill Surprises Friends, Skeptics," Defense Week, 7 November 94, 3.

<sup>85</sup>\_\_\_\_\_, "B1-B Passes 'Wartime' Test, Air Force Says," Defense Daily, 21 November 94, 258.

<sup>86</sup>Ibid.

<sup>87</sup>Steve Watkins, "B-1B Tests Take Plane Out of Penalty Box," Air Force Times, 14 November 94, 7.

<sup>88</sup>BUR, 187.

<sup>89</sup>John Morrocco, "McPeak Defends Bomber Plan."

<sup>90</sup>Bowie, Frostic, Lewis, Lund, Ochmanek, and Propper, 45.

<sup>91</sup>Department of Defense Budget for Fiscal Year 1995, Procurement Programs (P-1), February 1994, F-2.

<sup>92</sup>John Morrocco, "Loh Seeks Bomber 'Buyback'," Aviation Week and Space Technology, 13 June 94, 24.

<sup>93</sup>John Morrocco, "Showdown Looms on Bomber Force," Aviation Week and Space Technology, 20 June 94, 25.

<sup>94</sup>BUR, 187-188.

<sup>95</sup>Johnson, 86.

<sup>96</sup>James W. Canan, "In Search of Equalizers," Air Force Magazine, July 1994, 24.

<sup>97</sup>Ibid., 27.

<sup>98</sup>Ibid.

<sup>99</sup>Steve Watkins, "Scenario 'Is Up in the Air', Plan to Cancel TSSAM Sends Services Scrambling," Air Force Times, 26 December 94, 22.

<sup>100</sup>Canan, 27.

<sup>101</sup>Ibid., 28.

<sup>102</sup>Green.

<sup>103</sup>Matthews, William, "Two War Strategy Faces Rising Criticism," Air Force Times, 19 September 94, 36.

## BIBLIOGRAPHY

### Books

- American Defense Annual 1991-1992. Edited by Joseph Kruzel. Strategic Forces, Table 4-1. U.S. Strategic Forces, New York: Lexington Books, December 1990.
- Bowie, Christopher, and Fred Frostic, Kevin Lewis, John Lund, David Ochmanek, and Philip Propper. The New Calculus: Analyzing Theater Campaigns. RAND Corporation: Santa Monica, CA, 1993.
- Kissinger, Henry. The White House Years. Boston: Little, Brown, 1979.
- Momyer, William W. Air Power in Three Wars. Washington, D.C.: U.S. Government Printing Office, 1978.
- Schwarzkopf, Norman H., with Peter Petre. It Doesn't Take A Hero. New York: Bantam Books, 1992.
- Tilford, Earl H., Jr. Setup: What the Air Force Did in Vietnam and Why. Maxwell AFB, AL: Air University Press, 1991.
- Warden, John A., III. The Air Campaign: Planning for Combat. Washington, D.C.: National Defense University Press, 1988.
- Willibanks, James H. Thiet Gap! The Battle of An Loc, April 1972. Combat Studies Institute: U.S. Army Command and General Staff College, Fort Leavenworth, Kansas, 1993.

### Government Publications

- AFM 1-1, Vol II. United States Air Force Basic Aerospace Doctrine. Washington, D.C.: HQ Department of the Air Force, March 1992.
- Berlan, Gregory J. "Forward Offense: Preparing the B-52 for Conventional War." Maxwell AFB: Air University Press, 1989.
- Department of Defense, "Conduct of the Persian Gulf War: Final Report to Congress, Performance of Selected Weapons Systems," Volumes I-III and Appendices. U.S. Government Printing Office: Washington, D.C., April 1992.
- Department of Defense, "Annual Report of the Secretary of Defense to the President and the Congress," U.S. Government Printing Office: Washington, D.C., 1994.
- Department of Defense Budget for Fiscal Year 1995, Procurement Programs (P-1), February 1994, F-2.
- Gulf Air Power Survey: Summary Report, Volume II, "Operations and Effectiveness," Washington, D.C.: GPO, 1993.

- Hobbs, Daniel E. "Adapting Strategic Aircraft Assets to a Changing World," Maxwell AFB, AL: Air University Press, 1994.
- Monroe, Kent M., Paul A. Maye, and Walter E. Webb, Employment of the Manned Strategic Bomber in Nonnuclear War: A Perspective. Maxwell AFB, AL: Air University Press, 1978, 70.
- Rich, Michael D. "When Should We Start High-Rate Production of the B-2?: An Analysis Based on Flight Test Results." RAND Corporation: Santa Monica, CA, Statement prepared for the U.S. Senate, 26 July 1991.
- United States Government Accounting Office. Report to the Chairman, Committee on Armed Services, House of Representatives. "Strategic Bombers: Adding Conventional Capabilities Will Be Complex, Time-Consuming, and Costly." B-250119 (5 February 1993).
- United States Government Accounting Office. Report to Congressional Requesters. "Comparison of Operational Capabilities and Support Costs for 15 Versus 20 Aircraft." B-253553 (20 August 1993).
- Vollmar, V. Frank. "The Conventional Bomber Force: War-Horses for Global Conflicts." Maxwell AFB, AL: Air University Press, 1992.

#### Articles and Periodicals

- Bird, Julie. "Back to the Gulf." Air Force Times, (24 Oct 1994), 15.
- Callahan, David. "Air Power Comes of Age." Technology Review, (August 94), 62-70.
- Canan, James W., "In Search of Equalizers." Air Force Magazine, (July 1994), 24-28.
- Canan, James W. "New Life for the B-2." Air Force Magazine, (August 1994), 10-12.
- Canan, James W. "McPeak Sums It Up." Air Force Magazine, (August 1994), 30-34.
- Cappacio, Tony. "B-1 Success in Readiness Drill Surprises Friends, Skeptics." Defense Week, (7 November 1994), 3.
- Cohen, Eliot A., "The Mystique of U.S. Air Power." Foreign Affairs, (January/February 1994), 116.
- Correll, John T. "Revelations and Moonshine." Air Force Magazine, (September 1994), 5.
- Correll, John T. "The High Risk Military Strategy." Air Force Magazine, (September 1994), 34-42.
- Correll, John T. "A Message From Seven Secretaries." Air Force Magazine, (March 1995), 2.
- Fulghum, David A., and John D. Morrocco. "Deutch Demands Cuts, Services Scramble Anew." Aviation Week & Space Technology, (29 August 1994), 22.
- Fulghum, David A. "Smart Weapons to Boost Impact of B-1, B-2 Force." Aviation Week & Space Technology, (2 May 1994), 48-49.

Green, Brian. "The Bomber Debate Continues." Air Force Magazine, August 1994, 9-11.

Green, Brian. "Highlights of the 1995 Defense Bill." Air Force Magazine, (October 1994), 11.

Grier, Peter. "What's Left of the Air Force Program." Air Force Magazine, (December 1994), 24-29.

Lynch, David J. "Bombers In The Guard." Air Force Magazine, (October 1994), 32-37.

Matthews, William, "Two War Strategy Faces Rising Criticism." Air Force Times, (19 September 1994), 36.

Morrocco, John, "USAF Bomber Force Could Drop To 100." Aviation Week and Space Technology, (13-20 Dec 1994), 28-29.

Morrocco, John, "McPeak Defends Bomber Plan." Aviation Week and Space Technology, (21 March 1994), 29.

Morrocco, John, "Israeli Have Nap Eyed as TSSAM Replacement." Aviation Week and Space Technology, (6 June 1994), 79-80.

Morrocco, John, "Loh Seeks Bomber 'Buyback'." Aviation Week and Space Technology, (13 June 1994), 24.

Morrocco, John, "Showdown Looms on Bomber Force." Aviation Week and Space Technology, (20 June 1994), 25-26.

Novak, James C. "America's Costliest Fleet of Lemons." The Humanist, (March/April 1994), 3.

Ochmanek, David, and John Bordeaux. "The Lion's Share of Power Production," Air Force Magazine, (June 1993), 42.

Oliveri, Frank. "B-1 Moves Front and Center." Air Force Magazine, (August 1994), 15.

Oliveri, Frank. "U.S. Stages Gulf Buildup." Air Force Magazine, (December 1994), 15.

Tirpak, John. "Hollow Pockets." Air Force Magazine, (December 1994), 52-56.

Watkins, Steven. "B1-B Surpasses Goals of Test, Service Says." Air Force Times, (29 August 1994), 30.

Watkins, Steve, "B-1B Tests Take Plane Out of Penalty Box." Air Force Times, (14 November 1994), 7.

Watkins, Steve, "Scenario Is Up in the Air," Air Force Times, (26 December 1994), 22.

Welch, Jasper. "Bomber Forces for a Cold Start Conflict," Air Force Magazine, (December 1994) 30-39.

\_\_\_\_\_. "Precision Bomb Programs May Merge." Aviation Week and Space Technology, (27 Sep 1993), 45.

\_\_\_\_\_. "Air Force Prepares to Operate B-2 Bomber," Aviation Week and Space Technology, (13-20 December 1993), 28.



- \_\_\_\_\_. "Clinton Proposes \$263.7 Billion For Defense, Weapons Programs in '95." Arms Control Today, (March 1994), 38.
- \_\_\_\_\_. "USAF To Test B-1B Operational Readiness." Aviation Week and Space Technology, (23 May 1994), 23.
- \_\_\_\_\_. "Debate Continues Over Size of Bomber Fleet." Jane's Defence Weekly, (20 August 1994), 5.
- \_\_\_\_\_. "Is A New Bomber On The Way." Air Force Times, (22 August 1994), 18.
- \_\_\_\_\_. "Readiness Task Force Presents Its Findings." Department of Defense News Release dated 22 July 1994. America Online, (6 October 1994).
- \_\_\_\_\_. "Iraq Alert Called Off." Reuter News Service, (20 October 1994).
- \_\_\_\_\_. "B1-B Passes 'Wartime' Test, Air Force Says." Defense Daily, (21 November 1994), 258.
- \_\_\_\_\_. "U.S. Strategic Nuclear Forces, End Of 1993." Nuclear Notebook, (January/February 1994), 65.
- \_\_\_\_\_. "Pentagon Moves to New Generation of Weapons." Reuter News Service, (14 February 1995).

#### Monographs and Unpublished Research Projects

- Garrett, Jerry D. "Strategic Airpower as Operational Fires: Integrating Long-Range Bombers into Campaign Design." Ft. Leavenworth: School of Advanced Military Studies, Command and General Staff College Monograph, 1991.
- Meck, Richard G. "Strategic Bombers in a Flexible Response Strategy." Newport RI: Naval War College Press, 1986.
- Mitchell, Howard J. "The Strategic Bomber Force: What Is It and What Are/Should Its Role Be In Conventional and Nuclear War." Student Report, Naval War College, Newport RI: Naval War College Press, 1989.
- Monroe, Kent M., Paul A. Maye, and Walter E. Webb. "Employment of the Manned Strategic Bomber in Nonnuclear War: A Perspective." Maxwell Air Force Base, AL: Air University Press, 1978.
- Murphy, Andre J. "A Parametric Analysis of the Effects of Dilution on Strategic Bomber Survival." Air Force Institute of Technology Press, 1986.
- Skelton, John D. "The Triad--A Relook: Should The United States Retain Its Land-Based ICBM Force?" Ft Leavenworth: Command and General Staff College Monograph, 1992.
- Teixeira, Leonard D. G. "Linebacker II--Strategic and Tactical Case Study." Maxwell AL: Air University Press, 1990.
- Thomas, Harry W. "Launch Under Attack: A Strategy to Enhance Deterrence." Ft Leavenworth: Command and General Staff College Thesis, 1980.

### Other Sources

- Aerospace Facts and Figures 1993-1994. "Military Aircraft Program Procurement Data." Aerospace Industries: Association of America, Inc., 1993.
- Department of Defense Appropriations for 1994. "Minutes of Hearings Before A Subcommittee of the Committee on Appropriations, House of Representatives." Washington, D.C.: U.S. Government Printing Office, 1993.
- Department of Defense News Conference Excerpts from SECDEF Les Aspin and Gen Colin Powell. Bottom-Up Review. Federal News Service, 1 September 1993.
- Hearing Testimony of the Defense Subcommittee of the Senate Armed Services Committee on 1994 Appropriations for Programs under Subcommittee Jurisdiction. Testimony provided by SECDEF Les Aspin. Federal News Service, 14 September 1993.
- HQ, Eighth Air Force. "Bomber Roadmap: The Warfighter's Guide to Heavy Bomber Employment." 13 August 1992.
- Johnson, Dana J. "Roles and Missions for Conventionally Armed Heavy Bombers--An Historical Perspective," RAND Corporation, Santa Monica, CA, 1994.
- Secretary of the Air Force Testimony before the House Armed Services Committee on the Current Posture and Future Outlook of the U.S. Air Force. U.S. Government Press, February 1992.

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